THE UNIVERSITY
of EDINBURGH

THE UNIVERSITY *of* EDINBURGH

Post-trauma factors associated with Posttraumatic Stress Disorder severity in older adults: a systematic review

and

The mediating role of early maladaptive schemas in the relationship between childhood traumatic events and Complex Posttraumatic Stress Disorder symptoms in older adults (>64 years)

Eleni Vasilopoulou

Submitted in part fulfilment of the degree of

Doctorate in Clinical Psychology

The University of Edinburgh

May 2019

DClinPsychol Declaration of Own Work

Name: Eleni Vasilopoulou

Title of Work: Post-trauma factors associated with Posttraumatic Stress Disorder severity in older adults: a systematic review

and

The mediating role of early maladaptive schemas in the relationship between childhood traumatic events and Complex Posttraumatic Stress Disorder symptoms in older adults (>64 years)

I confirm that this work is my own except where indicated, and that I have:

- Read and understood the Plagiarism Rules and Regulations
- Composed and undertaken the work myself
- Clearly referenced/listed all sources as appropriate
- Referenced and put in inverted commas any quoted text of more than three words (from books, web, etc.)
- Given the sources of all pictures, data etc. that are not my own
- Not made undue use of essay(s) of any other student(s), either past or present (or where used, this has been referenced appropriately)
- Not sought or used the help of any external professional agencies for the work (or where used, this has been referenced appropriately)
- Not submitted the work for any other degree or professional qualification except as specifie
- Acknowledged in appropriate places any help that I have received from others (e.g. fellow students, technicians, statisticians, external sources)
- Complied with other plagiarism criteria specified in the Programme Handbook
- I understand that any false claim for this work will be penalised in accordance with the University regulations
- Received ethical approval from the School of Health in Social Science, University of Edinbur

  OR

- Received ethical approval from an approved external body and registered this application and confirmation of approval with the School of Health in Social Science's Ethical Committee

Signature …… **Date** ……

Acknowledgments

A special thank you to Professor Thanos Karatzias for his advice and encouragement throughout all stages of this project. I would also like to thank my academic supervisor, Dr Azu Guzman for her support as well as Dr Philip Hyland for his help with the statistical analysis and interpretation of the research findings. I am also grateful to Dr David Gillanders for his very helpful workshops on mediation analysis.

Furthermore, I would like to thank all NHS clinicians who identified and referred service users to this research project, especially Dr Rachel Pickles, NHS Fife for her substantial support during the recruitment process. I also am grateful to Dr Donna Gilroy, Dr Hannah Wallace and Dr Lindsey Murray for their help in recruitment coordination. In addition, I would like to acknowledge Rowena Stewart for her library support as well as Charlotte Smith and Sandy McAfee for their contributions during the ethical approval process. A special thank you to Kate Forsyth and Dr Beata Michalska for their help with the data extraction and quality appraisal of the Systematic Review. I am also grateful to Jaana Campbell and the Lothian Older People Psychology Service admin staff for their help with the practical aspects of my thesis.

Most importantly, I would like to thank all the participants who offered their time and energy to take part in this research and made this project possible.

Table of Contents

Thesis Overview

This thesis is carried out in part fulfilment of the academic component of the Doctorate in Clinical Psychology at the University of Edinburgh. In line with the research portfolio format, an introduction, rationale and overview of the portfolio thesis is presented in the portfolio abstract. A lay summary of the thesis' background, methods and results is also included. Chapter One contains a systematic review examining post-trauma factors associated with Posttraumatic Stress Disorder (PTSD) severity. Chapter Two includes an empirical study which explores the relationship between experiences of childhood trauma, Early Maladaptive Schemas (EMS) and CPTSD. Both research projects focus on older adults who tend to be under-represented in trauma research. The Systematic Review is prepared for submission to the journal Clinical Psychology Review, while the empirical study has been submitted for publication to the British Journal of Clinical Psychology (BJCP). 'Blinded' sections of the empirical paper made reference to the systematic review and are removed in accordance to BJCP author guidelines, in the interest of double-blind peer review. Author guidelines are included in the Appendices A and Q (for the empirical paper and the systematic review respectively).

Word Count (excluding references and appendices)
Systematic review= 14,310
Empirical study= 5,158
Total thesis portfolio=20,828

Thesis Portfolio Abstract

Background: Research in Posttraumatic Stress Disorder (PTSD) and Complex PTSD (CPTSD) has traditionally focused on either children or adults, while older adults tend to be under-represented in trauma research. This has led researchers to argue that PTSD/CPTSD is under-diagnosed and under-treated within this population. A better understanding of the presentation and correlates of posttraumatic symptoms in later life is needed in order to inform assessment and the development of targeted interventions for older adults.

Method: A systematic review was conducted to explore factors associated with PTSD/CPTSD severity in older adults. This review identified gaps in the literature, including a dearth of research exploring childhood trauma. The subsequent empirical study attempts to address this gap by investigating the link between childhood trauma, Early Maladaptive Schemas (EMS), and CPTSD symptoms.

Results: The systematic review showed that coping/response, physiological and psychopathological factors exhibited the most consistent associations with PTSD severity. The empirical study added to this literature by demonstrating that EMS mediated the relationship between childhood trauma and CPTSD symptom severity. As CPTSD is a relatively new construct, this is the first study exploring its association with EMS and offers preliminary evidence on the potential efficacy of schema informed interventions following traumatisation.

Conclusion: Both the empirical study and the systematic review highlight factors affecting posttraumatic symptom severity in older people and have important implications for PTSD/CPTSD identification and treatment.

Thesis Lay Summary

Background: Trauma exposure can have a negative effect on people's wellbeing and can sometimes lead to the development of Posttraumatic or Complex Posttraumatic Stress Disorder (PTSD/CPTSD). PTSD can develop after a single traumatic event, while CPTSD is seen as a result of long-term, interpersonal trauma, particularly in childhood. These conditions include a variety of symptoms such as re-experiencing the traumatic event as if it was happening in the present, avoiding reminders of the traumatic event as well as a persistent sense of threat. People with CPTSD may also experience difficulties in managing their emotions, problems in relationships and can hold a negative view of themselves. Most people who experience traumatic events do not go on to develop posttraumatic symptoms. In order to better identify and respond to trauma exposed individuals in need of support, it is therefore important to understand which factors make people more likely to experience such symptoms. The majority of research in this topic has focused on either children or younger adults (<65), while little is known about the factors associated with the severity of these disorders in later life.

Method: The first part of this portfolio included systematically searching, selecting, appraising and summarising published research exploring factors occurring after the trauma, which are associated with PTSD severity in older people. The second part examined whether the degree of negative thought patterns that individuals hold about themselves, the world and the people around them (e.g. 'I don't fit in') can explain the relationship between early traumatic events and CPTSD symptoms among older adults.

Main findings: A systematic review of the literature showed increased levels of PTSD among older people who used unhelpful coping strategies. Published research also showed that older people with additional physical or mental health difficulties experienced more severe PTSD symptoms. Our results also indicated that the degree of negative thought patterns that participants held impacted on their level of symptoms: Participants reporting more negative thought patterns suffered more severe CPTSD symptoms.

Conclusions: Overall, our findings suggest that promoting coping strategies and therapeutically targeting additional physical and mental health problems might help reduce PTSD symptoms among older adults. Moreover, challenging negative thought patterns may

alleviate CPTSD symptom severity in older adults who have experienced childhood trauma. These results can inform clinical assessment and may support the development of trauma interventions for older people in order to promote positive outcomes for this population.

Chapter 1: Systematic Review Journal Article

Title: Post-trauma factors associated with Posttraumatic Stress Disorder severity in older adults: A systematic review

Eleni Vasilopoulou*, Trainee Clinical Psychologist, University of Edinburgh
Dr Beata Michalska, Clinical Psychologist, NHS Lothian
Kate Forsyth, Assistant Psychologist, NHS Lothian
Dr Azucena Guzman, Lecturer in Health and Aging, University of Edinburgh/ Clinical Psychologist, Department of Clinical Neuroscience, Western General Hospital
Prof Thanos Karatzias, Professor of Mental Health at Edinburgh Napier University/ Consultant Clinical Psychologist, Rivers Centre for Traumatic Stress.

Abstract

Individual vulnerability factors contribute to the development and severity of posttraumatic symptoms following trauma exposure. However, a systematic understanding of those factors in later life is currently missing. This information is essential for clinical assessment and can allow the provision of targeted interventions for older adults. The aim of this study was to provide an overview of individual and contextual factors associated with the severity of either Posttraumatic Stress Disorder or Complex Posttraumatic Stress Disorder in older adults. A systematic review was undertaken in line with PRISMA guidelines. Of the 6,947 citations identified, 49 studies published between 1992 and 2017 were included. No studies assessed diagnostic criteria for CPTSD, as per ICD-11. Narrative synthesis identified six categories of posttraumatic associated factors: 1) coping and response factors; 2) personality factors; 3) neuropsychological factors; 4) physiological factors 5) psychopathological factors and 6) social factors. The strongest available evidence was for coping/response, physiological and psychopathological factors, which displayed the most consistent associations with PTSD severity. Overall, our findings suggest that promoting coping strategies and therapeutically targeting physical and mental health comorbities might enable the reduction of PTSD symptoms among older adults. Limitations and directions for future research are discussed.

Keywords: PTSD, systematic review, older adults

*Correspondence to: Eleni Vasilopoulou, School of Health in Social Science, The University of Edinburgh Medical School, Teviot Place, EH8 9AG. Email: eleni.vasilopoulou@nhslothian.scot.nhs.uk

Statement 1: Role of Funding Sources: This work was prepared in part fulfilment of the degree of Doctorate in Clinical Psychology, funded by NHS Education for Scotland.

Statement 2: Contributors: Author A designed the study, wrote the protocol, conducted the search, study selection, data extraction, quality appraisal and completed the first manuscript draft, under the supervision of authors D and E. Author B independently conducted the search, selection and quality appraisal of the reviewed studies. Author C independently checked the data extraction forms for accuracy. All authors have approved the final manuscript.

Statement 3: Conflict of Interest: The authors declare no conflict of interest.

Highlights:

- Maladaptive coping strategies as well as cognitive factors such as posttraumatic cognitions and sense of coherence were associated with PTSD severity in older adults.
- A consistent association was found between PTSD and psychopathological factors, especially anxiety and depression.
- An inverse association was found between physical health and PTSD in later life.

1. Introduction

Posttraumatic stress disorder (PTSD) and Complex Posttraumatic Stress Disorder (CPTSD) are conceptualised as two related diagnoses within the spectrum of stress and trauma disorders. PTSD can develop as a response to trauma exposure and is characterised by re-experiencing of the traumatic event, avoidance of traumatic reminders and a sense of a current threat (World Health Organisation [WHO], 2018). Diagnosis of PTSD as per ICD-11 typically requires the endorsement of three symptom clusters (re-experiencing, avoidance/numbing, and hyperarousal/hypervigilance). However, sub-threshold definitions of PTSD have also been proposed (Naylor, Dolber, Strauss, Kilts, Strauman, & Bradford). Subthreshold PTSD refers to the presence of clinically significant symptoms, which may require intervention, albeit in the absence of a full-PTSD diagnosis (McLaughlin et al., 2015).

Complex Posttraumatic Stress Disorder (CPTSD) has been included in the 11th Revision of the International Classification of Diseases (ICD-11) as a sibling condition to Posttraumatic Stress Disorder (PTSD) (WHO, 2018). CPTSD is considered a result of exposure to cumulative, interpersonal trauma, particularly in childhood. In addition to PTSD symptoms, CPTSD also comprises of symptom clusters that highlight self-organisation disturbances (affective dysregulation, negative self-concept and disturbances in relationships) (Karatzias et al., 2017).

Although exposure to a traumatic event is a prerequisite for the diagnosis of either PTSD or CPTSD, most people who experience traumatic events do not go on to develop clinical or subclinical posttraumatic symptoms. Worldwide prevalence estimates show that 70% of the population has experienced one or more traumatic events (Benjet et al., 2016). However, PTSD and CPTSD lifetime prevalence rates are estimated to be around 4.0% and 3.3% respectively (Karatzias et al., 2018). It is therefore recognised that individual vulnerability factors contribute to the development and severity of either of the two conditions following trauma exposure (Wade, Hardy, Howell, & Mythen, 2013). In this context, increasing efforts have been made to identify factors associated with posttraumatic psychopathology in order to inform assessment, prevention and early intervention initiatives (Southwick, Vythilingam, & Charney, 2005; Yehuda, Flory, Southwick, & Charney, 2006). These efforts have traditionally focused on children (Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012) and young adults (Ozer, Best, Lipsey, & Weiss, 2003).

In recent years an increased number of studies have sought to examine factors associated with posttraumatic symptomatology, specifically within the older adult population (Lapp, Agbokou, & Ferreri, 2011). This is driven by research suggesting that older adults with posttraumatic symptomatology may present differently to other age groups due to age-related biological, psychological and social changes. In particular, old-age specific stressors such as decreased health, retirement, loss of a loved one and reduced financial means may interfere with individuals' capacity to cope with previous traumatic events (Böttche, Kuwert, & Knaevelsrud, 2012; Grenade & Boldy, 2008). Age-related cognitive decline could have further implications for the emergence and profile of PTSD (Floyd, Rice, & Black, 2002; Ruzich, Looi, & Robertson, 2005). Finally, societal implications such as a historical lack of knowledge regarding posttraumatic stress might affect older adults' adaptation to early traumatic events and reduce their opportunities to access appropriate support (Averill & Beck, 2000; Cook & Simiola, 2017). The need to focus on severity associated factors specifically in later life is further emphasised by studies demonstrating preliminary differences between older and younger adults in terms of posttraumatic symptom profiles and disorder onset (Böttche et al., 2012; Davison et al., 2006; Reynolds, Pietrzak, El-Gabalawy, Mackenzie, & Sareen, 2015; Ruzich et al., 2005).

Older adult research has identified PTSD severity associated factors, such as childhood trauma (Ogle, Rubin, & Siegler, 2013), lower social support (Acierno, Ruggiero, Kilpatrick, Resnick, & Galea, 2006; Chen, Shen, & Chen, 2012) decreased physical health (Van Zelst, de Beurs, Beekman, Deeg, & van Dyck, 2003) and cognitive deficits (Burri, Maercker, Krammer, & Simmen-Janevska, 2013). Nevertheless, the factors affecting posttraumatic severity in older adults are not fully understood. In fact, PTSD in later life has been described as an under-recognised and under-treated condition (Cook, McCarthy, & Thorp, 2017) while significant gaps in service provision for trauma exposed older people have been identified (Burri et al., 2013; Krammer, Kleim, Simmen-Janevska, & Maercker, 2016; Parker et al., 2016). This is particularly concerning especially considering the projected rise in the aging population, which signifies a heightened need for appropriate gerontological assessment and treatment (Joint Commissioning Panel for Mental Health, 2013).

In order to further our understanding of PTSD/CPTSD severity associated factors, this review aimed to systematically examine and analyse studies within the older adult population investigating (a) the relationship between PTSD or CPTSD severity and pre-trauma factors

(b) the relationship between PTSD or CPTSD severity and peri-trauma factors or (c) the relationship between PTSD or CPTSD severity and post-trauma factors. Pre-trauma factors occur prior to the traumatic event and can include age, gender, race/ethnicity, pre-trauma cognitive ability, socio-economic status and pre-trauma neurobiological factors (Brewin et al., 2000; DiGangi et al., 2013; Feder et al., 2009; Yehuda & Flory, 2007). Peri-traumatic factors are concurrent with trauma exposure and may include trauma severity, trauma duration and type of trauma exposure (Ozer et al., 2003). Post-trauma factors occur following traumatisation and can include comorbid illnesses, additional life stress, social and family support, coping strategies, cognitive schemas and physical health (Johnson & Thompson, 2008; Karatzias et al., 2016; Udwin, Boyle, Yule, Bolton, & O'Ryan, 2000).

Due to the limited number of studies examining pre- and peri-trauma factors, as well as the high variability in pre- and peri-trauma factors examined, types of trauma, inclusion criteria and recruitment methods, it was not possible to draw valid findings from this literature (Cuijpers, 2016; Sharpe, 1997). Therefore, studies measuring pre- and peri-trauma factors were not addressed in this systematic review. The decision to exclusively focus on post-trauma factors was also influenced by previous research reporting stronger effect sizes of posttraumatic factors, compared to factors operating before the trauma occurrence (Brewin, Andrews, & Valentine, 2000). Furthermore, posttraumatic factors may be particularly relevant to older people as they are directly linked to age-associated challenges which may affect older people's mental health, including decreased physical health and functioning (Chatterji, Byles, Cutler, Seeman, & Verdes, 2015), reduced social support (Iliffe et al., 2007), increased loneliness (Theeke, 2009) and cognitive deficits (Grady, 2008).

Identifying post-trauma factors associated with PTSD severity among older adults is essential in recognising and clarifying areas in need of support within this population. Specifically, a better understanding of these factors can improve psychological assessment, prevention and treatment, thereby enabling clinicians to support traumatised individuals before their difficulties become ingrained. In addition, knowing which factors contribute to PTSD/CPTSD severity could be useful in reducing the financial and public health burden associated with these conditions, for example through the development of stepped, targeted interventions. On a theoretical level, knowledge of severity associated factors may increase our understanding of PTSD/CPTSD and help shape theoretical and treatment models for this

age group. Finally, such knowledge can identify research limitations and highlight areas for further research.

2. Methods

2.1. Search

An initial search of the Cochrane Database of Systematic Reviews (CDSR) and the Database of Abstracts of Reviews of Effects (DARE) was performed to ensure the absence of similar reviews. Following this, a systematic database search was conducted in February 2018 to identify relevant studies. The following databases were included in the search: MEDLINE, PsycINFO, Embase, CINAHL, ASSIA, PILOTS and Sociological Abstracts. A combination of different keyword searches was entered in each database. Broader terms were preferred due to the relative dearth of empirical research on this topic. The keywords referring to PTSD and CPTSD were "Post traumatic*", "Posttraumatic*", "Complex post trauma*" and "Complex posttrauma*". These were combined with the keywords "older adult*", "older people", "geriatric", "old age", "aged" and "elderly". A combination of index and MeSH terms were used according to the requirements of each database. Language (English) and publication date restrictions (later than 1980) were imposed. Reference lists of relevant articles were also reviewed.

2.2. Inclusion and exclusion criteria

The present review included quantitative studies based on the following inclusion and exclusion criteria: (a) studies had to include participants exposed to either single event trauma or cumulative trauma, as per PTSD diagnostic criterion A (APA, 2013); (b) studies were considered for inclusion if at least 50% of their sample comprised of adults older than 59 years; (c) studies had to use PTSD or CPTSD questionnaires to measure posttraumatic severity; (d) studies needed to report continuous data or PTSD/CPTSD diagnostic status; (e) research was considered for inclusion if it examined the interaction of PTSD/CPTSD with post-trauma related factors; (f) studies utilising a between groups design comparing groups

differing on PTSD/CPTSD diagnostic status or severity were also included; (g) research addressing the impact of interventions on trauma symptoms was excluded as it had a different focus; (h) the search was limited to studies published in English due to the lack of translation resources; (i) the search was also limited to studies conducted after 1980, when PTSD was first codified as a disorder in the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III).

2.3.1. Data extraction

Details from eligible studies were extracted using a pre-designed data extraction form (Appendix R). The following data were extracted: (a) study design (b) total number of participants (c) type of trauma exposure; (d) associated factors measured; (e) participant characteristics, such as age, gender, PTSD/CPTSD diagnosis; (f) participant inclusion and exclusion criteria; (g) information on the measures used; (h) data collection process; (i) data analysis procedure; (j) main findings and (k) conflict of interest/source of funding. A second author independently checked the extracted data for accuracy. No discrepancies occurred between authors.

2.3.2 Quality appraisal

A quality appraisal checklist was created in order to evaluate the quality of the reviewed studies. This was created based on the 'STROBE Statement: Checklist of items that should be included in reports of cross-sectional studies' (Von Elm et al., 2014) and other published tools (McLean, Maxwell, Platt, Harris, & Jepson, 2008; Scottish Intercollegiate Guidelines Network, 2012). Quality factors included background information, participant selection, measures, statistical analysis and generalisability of findings. All studies were rated independently by the first and second authors of this review. To assess inter-rater reliability, Cohen's Kappa coefficient was calculated (k=0.95). Deviating evaluations were discussed and a consensus rating was obtained.

3. Results

3.1. Database search

Database search elicited 6,947 records, of which 5,473 remained after the removal of duplicates. After screening of title and abstract, 307 studies were identified as possible relevant studies and were examined for eligibility. Of those, 49 studies fulfilled the inclusion criteria and were included in the review. At this stage the reference lists of identified papers were searched manually to identify possible omitted studies. No additional studies that met the inclusion criteria were identified. As a result, 49 studies were selected for the review. The literature search is outlined in more detail in Figure 1. The Kappa inter-rater reliability coefficient for study selection was k=0.85, indicating high agreement between raters.

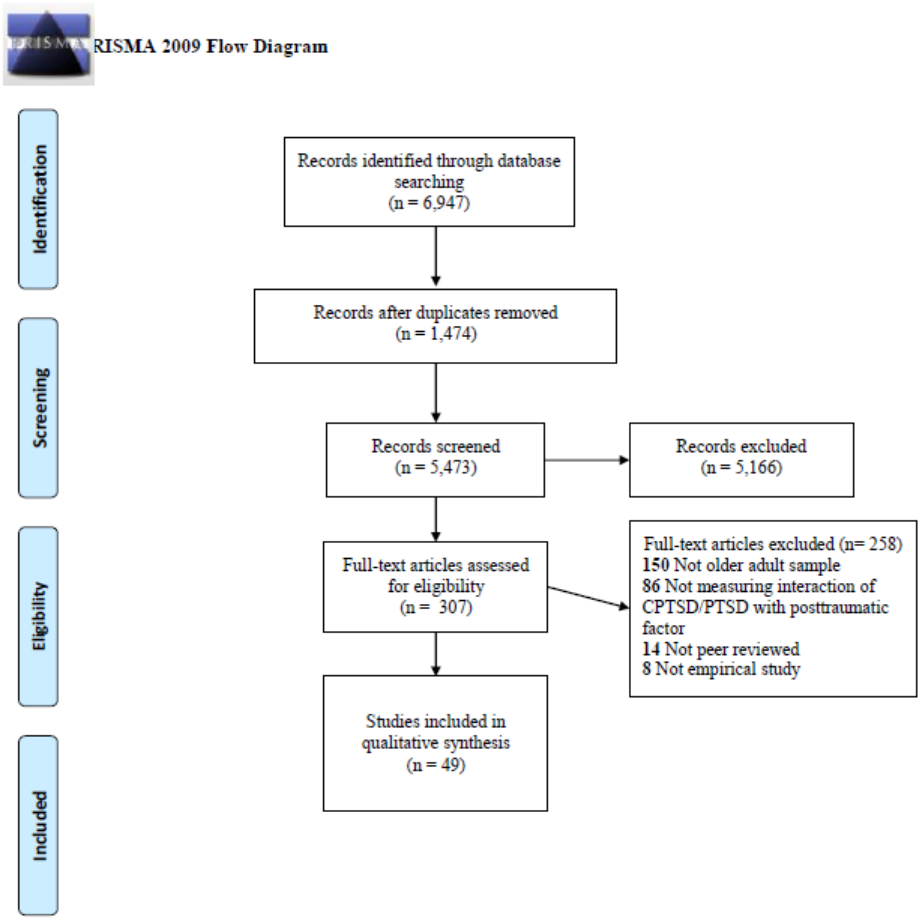


Fig.1. Prisma Flow Diagram (Moher, Liberati, Tetzlaff, & Altman, 2009)

3.2. Sample size and participant characteristics

Study sample sizes ranged widely from n=14 to n=24,719 (Mean=2,578; Median=204.5). Three sets of studies (Cook, Riggs, Thompson, Coyne, & Sheikh, 2004; O'Donnell, Cook, Thompson, Riley, & Neria, 2006), (Glaesmer, Brähler, Gündel, & Riedel-Heller, 2011; Glaesmer, Kaiser, Bräehler, Freyberger, & Kuwert, 2012; Häuser, Glaesmer, Schmutzer, & Brähler, 2012), (Van Zelst et al., 2003; van Zelst, de Beurs, Beekman, van Dyck, & Deeg, 2006) used the same samples so metadata pertaining to each set of studies are only calculated once. The majority of the studies (N=30; 66.7%) had sample sizes of less than 300 and an additional ten studies (22%) had sample sizes between 301 and 2,000. Twelve studies did not report how many participants met criteria for a diagnosis of PTSD. In the remaining studies, a quarter of trauma-exposed participants fulfilled criteria for either Full (n=19,646; 22%) or sub-threshold PTSD (n=2,797; 3%). In both full and sub-threshold PTSD groups, the majority of participants were male (93% and 82% respectively), although almost half of the studies (N=24, 49%) did not provide gender information for specific diagnostic groups. Twenty studies provided information on the mean age of the overall sample which ranged from 63.4 to 83.4 (mean across studies=72.6, SD= 5.3). Twelve studies provided specific information on the means of each diagnostic group (mean across studies PTSD group: 70.3, SD=4.9; Control group: 71.4, SD=3.9). The majority of studies (N=38, 78%) included older adults recruited from the community, while eleven studies (22%) included clinical samples (table 1).

3.3. Type of trauma exposure

The majority of articles (n=29; 59%) included participants who had suffered war related trauma (veterans: n=15; prisoners of war: n=6; displacement n=3, holocaust survivors: n=3, war-stricken area: n=1; war experience: n=1). Exposure to natural disaster was the second most commonly reported traumatic experience (n=3; 6%). Other trauma types included were physical illness (stroke: n=1, myocardial infraction: n=1, spinal cord injury: n=1), fall (n=1) and spousal bereavement (n=1). Ten studies (21%) included all types of traumatic exposure and did not specify trauma type. All studies apart from two (Burri et al., 2013; Krammer et

al., 2016) included participants exposed to trauma in adulthood or later life as opposed to childhood trauma.

3.4. PTSD assessment

Twenty-eight studies (57%) assessed full diagnostic criteria for PTSD, while eight studies included sub-threshold PTSD diagnoses (16%), utilising symptom counts, rather than a full PTSD diagnosis. Thirteen studies (27%) included both full and sub-threshold PTSD criteria. Diagnostic measures included were based on the DSM-III (n=1; 2%), the DSM-Third Edition, Revised (DSM-III-R, n=8; 16%), the DSM-Fourth Edition (DSM-IV, n=35; 71%), the DSM-Fifth Edition (DSM-5, n=1; 2%) or the ICD-Ninth Edition (ICD-9, n=4; 8%) criteria. Versions of the PTSD Checklist (n=8; 16%), Structured Clinical Interview for DSM (n=8; 16%), Clinician Administered PTSD Scale (n=7; 14%), Posttraumatic Stress Diagnostic Scale (n=7; 14%), and Impact of Event Scale-Revised (n=3; 6%) were the measures most commonly used (a list of all measures is provided in table 2). No studies assessed diagnostic criteria for CPTSD, as per ICD-11.

Table 1: Study and Sample Characteristics

Author	Purpose of Study	Assessment Schedule	Associated factors	Study design	Age: Mean (SD)	Sample Size (Overall sample or by diagnostic group)	Gender (Overall sample or PTSD group)	Sample
Acierno et al., (2006)	To identify PTSD associated factors in different age groups	N/A (Cross-sectional)	Coping and Response; Physiological; Social	Cross-sectional	71.0 (7.9)	N=1,130	Overall sample: F:727; M=401	Community
Beal (1995)	To examine the incidence and associated factors of PTSD	Longitudinal (T1: post-trauma; T2: 50 years later)	Psychopathological, Social	Longitudinal, between groups (PTSD/No PTSD)	NR	N=276	NR	Community
Boals & Schuettler (2011)	To examine the relationship between Event centrality and PTSD symptoms	N/A (Cross-sectional)	Coping and Response	Cross-sectional	73.3 (7.3)	N=126	Overall sample: F=92; M=34	Community
Brodaty et al., (2004)	To determine factors associated with PTSD and psychological morbidity	N/A (Cross-sectional)	Coping and Response; Physiological; Social	Cross-sectional, between groups (PTSD/ No PTSD)	PTSD 76.1 (5.6); No PTSD: 72.8 (6.5)	PTSD: N=39; No PTSD: N=61	F=25; M=14	Community

Burri et al., (2013)	To investigate the relationship between trauma and cognitive function	N/A (Cross-sectional)	Neuropsychological	Cross-sectional, between groups (PTSD/ No PTSD)	77.6 (6.3)	PTSD: N=22; No PTSD: N=74	Overall sample: F=41; M=55	Community
Carlson et al., (2008)	To examine the correlation between PTSD symptoms and cognitive function	N/A (Cross-sectional)	Neuropsychological	Cross-sectional	77.7 (6.4),	PTSD: N=32	Overall sample: M=32; F=0	Clinical
Chen et al., (2012)	To determine the prevalence and associated factors of PTSD	N/A (Cross-sectional)	Social	Cross-sectional	NR >60	PTSD: N=65; No PTSD: N=222	F=50; M=15	Community
Chung, Preveza, Papandreou, & Prevezas (2006)	To investigate PTSD and locus of control according to age	N/A (Cross-sectional)	Personality	Cross-sectional	64.57 (4.0)	Full PTSD: N=4; Sub PTSD: N=8; No PTSD: N=2	Overall sample: F=6; M=8	Clinical
Chung, Berger, Jones, & Rudd (2008)	To investigate comorbidity and coping differences in different PTSD diagnostic groups	N/A (Cross-sectional)	Coping and Response; Physical; Psychopathological; Social	Cross-sectional, between groups (PTSD/ Sub PTSD/ No PTSD)	PTSD: 69.4 (6.8); Sub PTSD: 70.3 (7.0); No PTSD: 71.3 (8.0)	PTSD: N= 29; Sub PTSD: N=40; No PTSD: N=27	Full PTSD: F=8, M=21; sub PTSD: F=5, M=35	Clinical

Chung et al., (2009)	To examine levels of PTSD and factors predictive of PTSD post-fall	Longitudinal: T1: immediately post trauma ; T2: after 12 weeks T3: after 24 weeks	Psychopathological	Longitudinal	83.4 (6.9)	N=195	Overall sample: F=167; M=28	Clinical
Cook et al., (2004)[1]	To examine the association of PTSD with the quality of intimate relationships	N/A (Cross-sectional)	Social	Cross-sectional between groups (PTSD/No PTSD)	80 (NR)	PTSD: N=120; No PTSD: N=198	NR	Community
Cooper et al., (2014)	To assess how PTSD relates to Coronary Artery Disease and how this relationship differs by race/ethnicity.	N/A (Cross-sectional)	Physical	Cross-sectional, between groups (PTSD & Depression/ No PTSD & Depression)	White: 67.0(7.6); Black: 64.8(5.8); Hispanic:66.2 (7.1); Asian: 66.6 (7.2) American Indian/Alaskan Native: 64.8 (5.8)	PTSD & Depression: N=10,608; No PTSD & Depression: N=14,111	NR	Clinical
Durai et al., (2011)	To investigate the prevalence of PTSD symptomatology and its association with health characteristics	N/A (Cross-sectional)	Physiological, Social	Cross-sectional, between groups (Full PTSD/ Sub PTSD/ No PTSD/ Non-Exposed)	NR (>65)	Full PTSD: N=228; Sub PTSD: N=1,813; No PTSD: N=3,544; Non-exposed: N=11,620	Full PTSD: F=0, M=228; Sub PTSD: F=0; M=1813	Community

Engdahl et al., (1997)	To explore psychiatric disorders and their correlates in OA with histories of trauma exposure.	N/A (Cross-sectional)	Social	Cross-sectional (PTSD/No PTSD)	Median=71	PTSD: N=77; No PTSD: N=185	F=0; M=77	Community
Falger et al., (1992)	To examine the relationships between PTSD, and cardiovascular risk factors in WWII veterans.	N/A (Cross-sectional)	Physiological	Cross-sectional, between groups (PTSD/No PTSD)	PTSD: 63.8 (NR); No PTSD: 64.5 (NR)	PTSD: N=82; No PTSD: N=65	F=0; M=82	Community
Favaro et al., (2006)	To investigate the characteristics of full and Sub PTSD in a sample of WWII prisoners of war.	N/A (Cross-sectional)	Personality factors, Psychopathological	Cross-sectional between groups (PTSD/ Sub PTSD/ No PTSD)	71.6 (2.4)	PTSD: N = 13; Sub PTSD: N= 32; No PTSD: N= 21	Overall sample: F=11; M=55	Community
Ferrajao & Oliveira (2016)	To explore the effects of combat exposure and sense of coherence on PTSD and depression	N/A (Cross-sectional)	Coping and Response	Cross-sectional	64 (NR)	N=120	Overall sample: F=0; M=120	Community.
Glaesmer et al., (2011)[2]	To investigate the association of trauma exposure, PTSD, health care utilisation and physical morbidity	N/A (Cross-sectional)	Physiological	Cross-sectional, between groups (PTSD/No PTSD/Non-exposed)	Range 60-85	PTSD: N=67; No PTSD: N=423; Non-Exposed: N=966	F=36; M=31	Community

Glaesmer et al., (2012)[2]	To assess the frequency of PTSD and its association with comorbidity and psychopathology	N/A (Cross-sectional)	Psychopathological	Cross-sectional	Range: 60-85	PTSD symptoms: N=270; No PTSD symptoms: N=1,389	F=161; M=109	Community
Gluck et al., (2016)	To investigate how sense of coherence and mindfulness influence PTSD symptoms and cognitions	N/A (Cross-sectional)	Personality, Coping and response	Cross-sectional	73.6 (6.9)	N=97	Overall sample: F=66; M=31	Community
Hall et al., (2014)	To examine the effect of PTSD on function and physical performance	N/A (Cross-sectional)	Physiological	Cross-sectional, between groups (PTSD/ No PTSD)	PTSD: 62.9 (3.9); No PTSD: 68.6 (6.2)	PTSD: N=67; No PTSD: N=235	F=0; M=67	Clinical
Hart et al., (2008)	To explore differences in cognitive performance between No PTSD, PTSD & comorbidity, and PTSD groups	N/A (Cross-sectional)	Neuropsychological	Cross-sectional, between groups design (PTSD/Comorbid PTSD/No PTSD)	PTSD: 80.9 (2.3); Comorbid PTSD:79.3 (1.5); No PTSD:80 (2.2)	PTSD: N=7; No PTSD: N=11; Comorbid PTSD: N=7	NR	Community
Häuser et al., (2012)[2]	To examine the association between lifetime traumatic events, widespread pain, PTSD and depression	N/A (Cross-sectional)	Physiological	Cross-sectional	No pain: 69.4 (6.1); Pain: 70.7 (6.8)	PTSD:N=112, Sub PTSD: N=224, No PTSD: N=437	NR	Community

Hyer & Boyd (1996)	To examine the association between PTSD and personality variables	N/A (Cross-sectional)	Personality	Cross-sectional	69.7 (5.1)	PTSD: n=40; No PTSD: n=80	M=40	Community
Hyer et al., (1999)	To examine the relationship between PTSD and depression	N/A (Cross-sectional)	Physiological; Social	Cross-sectional	68.1 (NR)	N=139	Overall sample: F=0; M=139	Clinical
Jelinek et al., (2013)	To investigate neuropsychological performance in a trauma sample	N/A (Cross-sectional)	Neuropsychological	Cross-sectional between groups (PTSD/ No PTSD/Non exposed)	PTSD: 71.0 (2.5); No PTSD: 70.9 (1.8); Non-exposed: 72.3 (2.9)	PTSD: N=20; No PTSD: N=24; Non-exposed: N=11	F=14; M=6	Community
Kang et al., (2006)	To examine whether PoW status was associated with cardiovascular diseases and PTSD	N/A (Cross-sectional)	Physiological	Cross-sectional between groups (PTSD/ No PTSD)	PoW (PTSD and No PTSD): 70.2 (NR); Non-exposed= 69.9 (NR)	PTSD: N= 3,254; No PTSD: N=16,188	F=0; M=3254	Community
Kidson et al., (1993)	To determine PTSD frequency and mental health differences between PTSD and no PTSD	N/A (Cross-sectional)	Psychopathological	Cross-sectional between groups (PTSD/ No PTSD)	PTSD: 70.7 (3.3); No PTSD: 72.5 (4.5)	PTSD: N=49; no PTSD: N=59	F=0; M=49	Clinical

Kiphuth et al., (2014)	To assess anxiety, depression, PTSD, QoL, and coping in TIA	N/A (Cross-sectional)	Coping and Response; Physiological; Psychopathological	Between groups (PTSD/No PTSD)	Median (IQR): PTSD: 64.5 (22); No PTSD: 71 (14)	PTSD: N=32, No PTSD: N=76)	F=15; M=17	Clinical
Knight et al., (2017)	To examine the relationship of PTSD and depression severity/symptoms with cortical and subcortical surfaced-based morphometry	N/A (Cross-sectional)	Neuropsychological; Psychopathological	Cross-sectional	PTSD: 67.6 (4.0); No PTSD: 70.5 (5.0)	PTSD: N= 35; No PTSD: N= 45	F=0; M=35	Clinical
Krammer et al., (2016)	To investigate the association between trauma, CPTSD and mediating factors	N/A (Cross-sectional)	Social	Cross-sectional	77.0 (7.1)	N=116	Overall sample: F=46; M=70	Community
Kuwert et al., (2012)	To assess trauma, PTSD and somatisation	N/A (Cross-sectional)	Psychopathological	Cross-sectional between groups (PTSD/ No PTSD)	Range: 60-85	PTSD: N=67; No PTSD: N= 1,590	Overall sample: F=887; M=770	Community
Leskela et al., (2002)	To examine the role of guilt and shame in PTSD	N/A (Cross-sectional)	Coping and response	Cross-sectional (PTSD/No PTSD)	75.4 (3.3)	PTSD: N=29; No PTSD: 73	F=0; M=29	Community

McLeay et al.,(2017)	To examine the impact of PTSD on health	N/A (Cross-sectional)	Physiological	Cross-sectional	PTSD: 68.5 (4.1); No PTSD: 69.2 (4.2)	PTSD: N=108; No PTSD: N=106	F=0; M=108	Clinical
O'Connor (2010)	To investigate the frequency of PTSD and associated factors in bereaved OA	Longitudinal: T1: 2 months; T2: 6 months; T3:13 months; T4:18 months post trauma	Coping and Response; Personality; Social	Longitudinal, between groups (PTSD/ No PTSD)	73 (4.4)	PTSD: N=46; No PTSD: N=250	Overall sample: F=184; M=112	Community
O'Donnel et al., (2006)[1]	To examine the relationship between PTSD and depression	N/A (Cross-sectional)	Psychopathological	Cross-sectional, within group	Range 70-100	N=331	Overall sample: F=0; M=331	Community
Ogle et al., (2014)	To examine the impact of cumulative trauma exposure on PTSD symptom severity	Prospective (Cross-sectional data for this question)	Coping and Response; Personality; Social	Prospective (Cross-sectional data for this question)	60.8 (1.6).	N=805	Overall sample: F=805; M=0	Community
Ogle et al., (2016)	To examine the factors accounting for PTSD symptom severity.	Prospective (Cross-sectional data for this question)	Coping and response; Personality; Psychopathological; Social	Prospective (Cross-sectional data for this question)	63.4 (2.8)	N=645	NR	Community

Pietrzak et al., (2012a)	To study the association of medical disorders, PTSD and sub PTSD	N/A (Cross-sectional)	Physiological	Cross-sectional, between groups (Full PTSD/ sub PTSD/ No PTSD)	NR >61	PTSD: N= 469; Sub PTSD: N= 545; No PTSD: N= 7,519	Sub PTSD: F=359, M=186; Full PTSD: F=327, M=142	Community
Qureshi et al., (2010)	To explore the association between PTSD and dementia	N/A (Cross-sectional)	Neuropsychological	Cross-sectional	PTSD+/PH-: 73.9 (5.3); PTSD-/PH+: 73.7 (5.0) PTSD+/PH+:73.3 (4.7) PTSD-/PH-: 73.8 (5.2)	PTSD+/PH: N=3,660; PTSD-/PH+: N=1,503; PTSD+/PH-: N=153; PTSD-/PH-: N=5,165	F=0; M=3,813	Clinical
Ron (2011)	To examine PTSD symptoms in groups differing by demographic characteristics and self-esteem	N/A (Cross-sectional)	Personality	Cross-sectional	76.7 (6.7)	N=167	NR (Overall sample: F=114; M=53)	Community
Schnurr et al., (2000)	To investigate PTSD and sub PTSD associated factors	N/A (Cross-sectional)	Social	Cross-sectional	71.9 (4.1).	PTSD: N=115; Sub PTSD: N=38, No PTSD: N=210	Full PTSD: F=0, M=115; Sub PTSD: F=0, M=38	Community

Spitzer et al., (2008)	To investigate comorbidity patterns within OA	N/A (Cross-sectional)	Psychopathological	Cross-sectional between groups (PTSD/ No PTSD)	Range: 65-79	PTSD: N=20; No PTSD: N=831	Overall sample: F=402; M=449	Community
van Zelst et al., (2003)[3]	To examine factors associated with PTSD	N/A (Cross-sectional)	Physiological; Personality; Social	Cross-sectional	PTSD: 72.4 (7.3); sub PTSD 75.0 (7.9); Non-Exposed: 73.6 (8.0)	PTSD: N= 13; Sub PTSD: N= 97; Non-Exposed: N= 312	Full PTSD: F=7, M=6; Sub PTSD: F=67, M=30	Community
van Zelst et al., (2006)[3]	To measure the impact of PTSD and sub PTSD on daily life functioning, well-being and health care use	N/A (Cross-sectional)	Physiological	Cross-sectional	PTSD: 72.4 (7.3); Sub PTSD 75.0 (7.9); Non-Exposed: 73.6 (8.0)	PTSD: N= 13; Sub PTSD: N= 97; Non-Exposed: N= 312	Full PTSD: F=7, M=6; Sub PTSD: F=67, M=31	Community
Wittekind et al., (2017)	To assess attentional biases in trauma survivors	N/A (Cross-sectional)	Neuropsychological	Cross-sectional, between groups (PTSD/No PTSD/Non-exposed)	PTSD/Sub PTSD: 72.75 (2.3); No PTSD 73.00 (2.0)	PTSD N=20; No PTSD N=26	F=18, M=2	Community
Yehuda et al., (1994)	To explore depressive symptoms, self-efficacy and cognitive distortion in PTSD/no PTSD survivors	N/A (Cross-sectional)	Coping and Response; Personality; Psychopathological	Cross-sectional between groups (PTSD/ No PTSD)	Range 62-80	PTSD; N=11; No PTSD N=12	NR	Community

Yehuda et al., (2004)	To assess learning and memory in Holocaust survivors with PTSD	N/A (Cross-sectional)	Neuropsychological	Cross-sectional, between groups (PTSD/No PTSD/Non-exposed)	PTSD: 68.2 (5.6); No PTSD: 68.4 (6.4); Non-exposed: 70.4 (6.8)	PTSD: N=36; no PTSD: N=26; non-exposed: N=40	F=25, M=11	Community
Zhang et al., (2012)	To investigate the prevalence rates of PTSD, anxiety and depression and their associated factors.	N/A (Cross-sectional)	Social	Cross-sectional	68.96 (7.1)	PTSD: N=72; no PTSD: N=212	F=49, M=23	Community

Table 1: CPTSD: Complex Posttraumatic Stress Disorder; F: Female; IQR: Interquartile Range; M=Male; NR: Not Reported; N/A: Not Applicable; OA: Older Adults; PH: Purple Heart Veterans; PoW: Prisoners of War veterans; PTSD: Posttraumatic Stress Disorder; QoL: Quality of Life; Sub: Sub-threshold PTSD; T1-T4: Assessment time 1-4; TIA: Transient Ischaemic Attack; WWII: World War II.

Table 2: Trauma Characteristics

Author	Type of trauma	Measure of PTSD symptoms	Full or Sub PTSD	Criteria
Acierno et al., (2006)	Natural disasters	National Women's Study PTSD module	Sub	DSM-IV
Beal (1995)	War related trauma (veterans)	Questionnaire based on DSM-III-R	Full	DSM-III-R
Boals & Schuettler (2011)	All types of trauma exposure	PCL-S	Sub	DSM-IV
Brodaty et al., (2004)	War related trauma (Holocaust)	PTSD diagnosis based on DSM-IV	Full	DSM-IV
Burri et al., (2013)	Childhood or Adulthood trauma	SSS	Full	DSM-IV
Carlson et al., (2008)	War related trauma (veterans)	PTSS-CI	Sub	DSM-IV
Chen et al., (2012)	Natural disasters	CAPS	Full	DSM-IV
Chung et al., (2006)	Spinal cord injury	PCL	Full and Sub	DSM-IV
Chung et al., (2008)	Myocardial Infraction	PDS	Full and Sub	DSM-IV
Chung et al., (2009)	Fall	PDS	Full and Sub	DSM-IV
Cook et al., (2004)[1]	War related trauma (veterans)	PCL	Full	DSM-IV

Cooper et al., (2014)	War related trauma (veterans)	Diagnosis of PTSD based on ICD-9	Full	ICD-9
Durai et al., (2011)	War related trauma (veterans)	Veterans' Health Administration Clinical Guidelines Tool (1997)	Full and Sub	DSM-IV
Engdahl et al.,(1997)	War related trauma (PoW)	SCID PTSD, SCID Non-Patient Edition. Psychological testing	Full	DSM-III-R
Falger et al., (1992	War related trauma (veterans)	Clinical Rating Interview based on the DSM-III, SCID	Full	DSM-III
Favaro et al., (2006)	War related trauma (PoW)	SCID	Full and Sub	DSM-IV
Ferrajao & Oliveira (2016)	War related trauma (veterans)	IES-R	Full	DSM-IV
Glaesmer et al., (2011)[2]	All types of trauma exposure	PTDS	Full	DSM-IV
Glaesmer et al., (2012)[2]	All types of trauma exposure	PTDS	Full and Sub	DSM-IV
Gluck et al., (2016)	War related trauma (experience of war)	Essen Trauma Inventory	Sub	DSM-IV
Hall et al., (2014)	War related trauma (veterans)	Review of medical records	Full	ICD-9
Hart et al., (2008)	War related trauma (PoW)	CAPS-2	Full	DSM-III-R

Hauser et al., (2012)[2]	All types of trauma exposure	PTDS	Full and Sub	DSM-IV
Hyer & Boyd(1996)	War-related trauma (combat veterans)	CAPS-1	Full	DSM-III-R
Hyer et al., (1999)	War-related trauma (combat veterans)	CAPS, DTREE, SCID PTSD	Full	DSM-III-R
Jelinek et al., (2013)	War related trauma (displacement)	SCID- German version	Full	DSM-IV
Kang et al., (2006)	War related (PoW)	ICD 9 Diagnosis	Full	ICD-9
Kidson et al., (1993)	War related (PoW)	Diagnosis by clinician based on DSM-III-R criteria	Full	DSM-III-R
Kiphuth et al., (2014)	TIA	PDS- German version	Full	DSM-IV
Knight et al., (2017)	War related trauma (veterans)	CAPS	Full	DSM-IV
Krammer et al., (2016)	Childhood trauma	Trauma Symptom Inventory	Sub	DSM-IV
Kuwert et al., (2012)	War related trauma (displacement)	PDS	Full	DSM-IV
Leskela et al., (2002)	War related trauma (PoW)	SCID PTSD, SCID Non-Patient Edition. Psychological testing.	Full	DSM-III-R

McLeay et al., (2017)	War related trauma (veterans)	Diagnosis using the CAPS-5	Full	DSM-5
O'Connor (2010)	Spousal bereavement	Harvard Trauma Questionnaire Part IV	Full and Sub	DSM-IV
O'Donnel et al., (2006)[1]	War related trauma (PoW)	PCL	Full	DSM-IV
Ogle et al., (2014)	All types of trauma exposure	PCL-S	Sub	DSM-IV
Ogle et al., (2016)	All types of trauma exposure	PCL-S	Sub	DSM-IV
Pietrzak et al., (2012a)	All types of trauma exposure	AUDADIS-IV	Full and Sub	DSM-IV
Qureshi et al., (2010)	War related trauma (veterans)	Diagnosis based on ICD-9	Full	ICD-9
Ron (2011)	War related trauma (war area residents)	Impact of Event Scale Revised	Sub	DSM-IV
Schnurr et al., (2000)	War related trauma (veterans)	PCL	Full and Sub	DSM-IV
Spitzer et al., (2008)	All types of trauma exposure	SCID	Full	DSM-IV
van Zelst et al., (2003)[3]	All types of trauma exposure	Self-Rating Inventory for PTSD, Comprehensive International Diagnostic Interview 2.1.	Full and Sub	DSM-IV
van Zelst et al., (2006)[3]	All types of trauma exposure	Self-Rating Inventory for PTSD, Comprehensive International Diagnostic Interview 2.1	Full and Sub	DSM-IV

Wittekind et al., (2017)	War related (displacement)	SCID-I	Full and Sub	DSM-IV
Yehuda et al., (1994)	War related (Holocaust)	SCID	Full	DSM-III-R
Yehuda et al., (2004)	War related (Holocaust)	SCID, CAPS	Full	DSM-IV
Zhang et al., (2012)	Natural Disasters	PCL-C	Full	DSM-IV

Table 2: Trauma characteristics: AUDADIS-IV: Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV; CAPS = Clinician Administered PTSD Scale; DSM-III: Diagnostic and Statistical Manual of Mental Disorders- 3rd edition. DSM-III-R: Diagnostic and Statistical Manual of Mental Disorders- 3rd edition Revised; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders- 4th edition; DSM 5: Diagnostic and Statistical Manual of Mental Disorders- 5th edition; DTREE: DSM-III-R Decision Tree; F: Female, ICD 9: International Classification of Diseases Ninth Revision. IES-R = Impact of Event Scale-Revised; M: Male; NR: Not Reported; SCID = Structured Clinical Interview for DSM disorders; PCL = PTSD checklist; PCL-C = PTSD Checklist-Civilian Version; PCL-S = PTSD Checklist-Specific; PDS = Posttraumatic Stress Disorder Scale; PTDS: Posttraumatic Diagnostic Scale; PTSD: Posttraumatic Stress Disorder; PTSS-CI Posttraumatic Stress Screen for the Cognitively Impaired; SCID-IV = Structured Clinical Interview for DSM-IV; SCID-PTSD: Structured Clinical Interview for DSM-III-R Non-Patient Version Modified for the Vietnam Veterans Readjustment Study; Sub: Sub-threshold PTSD; SSS: 7-item short screening scale for PTSD; TIA: Transient Ischaemic Attack.

3.5. Study quality

Twelve of the reviewed studies met the majority of the aforementioned quality criteria for cross-sectional studies (>80%) and were rated 'High Quality' (Acierno et al., 2006; Chung, Berger, Jones, & Rudd, 2008; Durai et al., 2011; Glaesmer et al., 2011; Glaesmer et al., 2012; Häuser et al., 2012; Kiphuth, Utz, Noble, Köhrmann, & Schenk, 2014; Kuwert, Braehler, Freyberger, & Glaesmer, 2012; Ogle, Rubin, & Siegler, 2014, 2016; Pietrzak, Goldstein, Southwick, & Grant, 2012a; Zhang, Shi, Wang, & Liu, 2011). The majority of remaining studies were rated "Good quality", meeting more than 50% of the included criteria, with the exception of four studies which did not meet half or more of the criteria assessed (Beal, 1995; Carlson, Lauderdale, Hawkins, & Sheikh, 2008; Falger et al., 1992; Ron, 2011).

All reviewed studies were characterised by a well-defined research question, objectives and rationale. The majority of studies used measures with good psychometric properties. In addition, most studies included appropriate analyses to examine the relationship between posttraumatic factors and PTSD symptoms.

The main area of weakness was found in the external validity of the reviewed studies. In regard to the sampling process, all studies, with the exception of eight (Chung et al., 2008; Durai et al., 2011; Glück, Tran, Raninger, & Lueger-Schuster, 2016; Häuser et al., 2012; Kang, Bullman, & Taylor, 2006; Ogle et al., 2014, 2016; Pietrzak et al., 2012a) used convenience clinical or self-referred samples and only four studies provided power calculations on how the sample size was reached. In addition, almost half (41%) of the included studies failed to obtain an adequate response rate (>50%) which could further limit the generalisability of the findings.

Lack of verification of the PTSD diagnosis by a professional as well as unreported confounding variables, such as magnitude of trauma exposure and social support (Brewin et al., 2000), were additional quality considerations. Finally, in regard to the statistical analysis, most studies did not explain how missing data were handled in the analysis.

3.6. PTSD associated factors

A similar categorisation of PTSD associated factors to the one used by DiGangi et al., (2013) was employed. Posttraumatic associated factors fell in the following six categories: 1. Coping and Response; 2. Neuropsychological; 3. Personality; 4. Physiological; 5. Psychopathological; 6. Social. A systematic qualitative synthesis was used to summarise the results of the reviewed studies. Findings are synthesised by category of associated factor.

3.6.1. Coping and response factors

Twelve studies examined the association between PTSD and various coping and response factors. Four studies investigated the role of posttraumatic coping in PTSD severity, showing a significant association. Results indicated differences between PTSD and no-PTSD individuals in terms of coping strategies (Chung et al., 2008). Furthermore, older adults who used immature defence styles such as projection, denial and splitting, were more likely to have a diagnosis of PTSD (Brodaty, Joffe, Luscombe, & Thompson, 2004). Kiphuth et al., (2004) showed that the risk of developing PTSD was 1.2 times higher for older adults utilising maladaptive coping strategies while in O'Connor et al., (2010) appraisal and coping predicted 30% of PTSD symptoms (table 3).

Three studies examined the relationship between event centrality and PTSD, showing a positive association (Boals & Schuettler, 2011; Ogle et al., 2014, 2016). Event centrality refers to the degree to which a traumatic experience is viewed as central to one's identity and life story (Berntsen & Rubin, 2006). Three studies examined the role of Sense of Coherence in the development of PTSD. Sense of Coherence is defined as the extent to which an individual perceives the world as comprehensible, manageable, and meaningful (Antonovsky, 1993). A negative association was found between sense of coherence and PTSD diagnosis in all studies. Furthermore, two studies explored the role of cognitions in PTSD severity. Posttraumatic cognitions mediated the relationship between mindfulness and PTSD symptoms in Glück et al., (2016) while Yehuda et al., (1994) showed increased cognitive distortions (self-criticism) in Holocaust survivors with PTSD compared to their non-PTSD counterparts. Only one study investigated the role of shame in PTSD, yielding a significant

association (Leskela, Dieperink, & Thuras, 2002). A full list of coping and response factors can be seen in table 3.

Overall, studies consistently revealed a positive association between maladaptive coping strategies and PTSD symptomatology. Furthermore, this review indicates the presence of a significant relationship between cognitive factors and PTSD, particularly in regard to posttraumatic cognitions, sense of coherence and event centrality.

3.6.2. Neuropsychological factors

Nine studies explored the association between PTSD and neuropsychological factors (table 4). Eight assessed differences in performance in standard neuropsychological assessments among groups differing in PTSD severity or diagnostic status. The majority of these studies (n=5, 62.5%) showed lower scores in one or more cognitive measures among participants with PTSD when compared to controls (Brodaty et al., 2004; Burri et al., 2013; Hart et al., 2008; Wittekind, Muhtz, Jelinek, & Moritz, 2017; Yehuda, Golier, Halligan, & Harvey, 2004). Impaired areas included premorbid intellectual functioning, executive functioning, attention and processing speed, as well as overall cognitive function as assessed by cognitive screening measures. More severe PTSD symptoms were also associated with slower reaction times for trauma-related words (but in no other word conditions) in Wittekind et al., (2017), however it is recognised that this may reflect attentional biases. Three studies (Carlson et al., 2008; Jelinek, Wittekind, Moritz, Kellner, & Muhtz, 2013; Knight, Naaz, Stoica, Depue, 2017) found no differences between groups, although one of these displayed significant methodological limitations in regard to PTSD assessment and generalisability of findings (Carlson et al., 2008). Evidence for an association between PTSD and neuropsychological factors was further supported by reviewed studies showing greater dementia prevalence (Qureshi et al., 2010) and decreased gray matter volume (Knight et al., 2017) among individuals screening positively for PTSD compared to controls.

In summary, most studies indicated decreased performance in neuropsychological assessments, greater dementia prevalence and decreased gray matter volume among participants with PTSD compared to controls.

Table 3: Coping and Response Factors

Author	Associated factor	Results	Analysis	Conclusions
Acierno et al., (2006)	Perceived positive outcomes	PTSD-Perceived positive outcomes B=0.07, ns	Regression Analysis	Perceived positive outcomes were not significantly associated with PTSD symptoms.
Boals & Schuettler (2011)	Event centrality	Centrality of event scale-PTSD: r(125) = .36, p < .001.	Correlation Analysis	The correlation between event centrality scores and PTSD scores was positive and significant for OA.
Brodaty et al., (2004)	Defence style	Immature defence style-PTSD: B=2.37; OR= 10.68, χ^2=14.60, p <0.001	Logistic Regression	OA who used immature defence styles such as fantasy, projection, dissociation, somatisation, denial and splitting, were more likely to have PTSD.
Chung et al., (2008)	Coping mechanisms	Suppression of competing activities [F(2, 69)=7.29; p<0.001], restraint coping [F(2, 69)=4.12; p<0.020], focusing on and venting of emotion [F(2, 69)=10.85; p<0.0001], behavioural disengagement F(2,69)=6.32, p=0.003 and mental disengagement F(2,69)=3.53, p=0.05	MANCOVA	Significant differences were found between groups in suppression of competing activities, restraint coping, seeking emotional social support, focusing on and venting of emotion, mental disengagement and behavioural disengagement.
Ferrajao & Oliveira (2016)	Sense of Coherence (SOC)	SOCS-IES-R: -.85, p<0.001	Logistic Regression	Participants who reported a strong SOC showed negative odds for exceeding clinical cut-off scores associated with a probable diagnosis of PTSD

Gluck et al., (2016)	Posttraumatic Cognitions, SOC	Direct effect of SOC on PTSD symptoms: B=−0.35 ($p<0.001$). The indirect effect of SOC on PTSD symptoms, mediated through the posttraumatic cognitions, was B=−0.23 ($p < 0.001$). PTSD-Posttraumatic cognitions: β=0.49. Mindfulness-PTSD: ns	Mediation Analysis	SOC was associated with PTSD symptoms. Posttraumatic cognitions mediated the relationship between mindfulness and PTSD symptoms. The path of mindfulness to PTSD symptoms was not significant.
Kiphuth et al., (2014)	Coping strategies	Maladaptive coping strategies was the strongest associated variable (OR=1.2; 1.07–1.32; p=0.001)	Logistic Regression	The risk to develop PTSD was 1.2 times higher for patients with TIA using maladaptive coping strategies.
Leskela et al., (2002)	Shame	PTSD-Shame: r=0.48, $p<0.001$;	Correlation Analysis	Shame was positively associated with PTSD.
O'Connor (2010)	Sense of meaning in relation to loss; Emotional Coping, SOC	Emotional coping, F=20.15, η=237.33 p=0.000; Detached coping, F=4.94, η=54.90 p=0.03; SOC: F=19.79, η=5227, p=0.000	ANOVA, Hierarchical Regression Analysis	Appraisal and coping at time 1 predicted 30% of PTSD symptoms at time 4.
Ogle et al., (2014)	Event centrality	Correlations: Event centrality/ PTSD severity: ρ=.56, $p<0.001$. Hierarchical regression: Event centrality explained 49% of symptom variance (R^2=0.49).	Hierarchical Regression Analysis/ Correlations	Event centrality emerged as a predictor of PTSD symptom severity.
Ogle et al., (2016)	Coping, Event centrality	Coping/PTSD r= –.32, $p<0.01$; Event centrality/PTSD: r= .52, $p<0.001$	Multiple Regression Analysis/ Correlations	Coping ability and event centrality were associated with PTSD symptom severity.

Yehuda et al., (1994)	Cognitive distortions (Self-criticism)	Self-Criticism: PTSD/No PTSD/Non-exposed: F = 3.7; df = 2,38; p < .035. PTSD>No PTSD and Non-Exposed	One-way ANOVA (two-tailed), post-hoc testing. Newman-Keuls test.	Holocaust survivors with PTSD scored significantly higher on the Self-criticism scale compared to those without PTSD and non-exposed controls.

Table 3: Df: degrees of freedom; IES-R: Impact of Event Scale-Revised; NS: Not Significant; OA: Older Adults; OR: Odds Ratio; PTSD: Posttraumatic Stress Disorder; PCL: PTSD checklist; PCL-C: PTSD Checklist-Civilian Version; SOC: Sense of Coherence.

Table 4: Neuropsychological factors

Author	Associated factor	Results	Analysis	Conclusions
Brodaty et al., (2004)	Neuropsychological performance (MMSE: overall cognitive function including tests of orientation, attention, memory, language)	MMSE performance: PTSD:24.9 (1.5), No PTSD:27.1 (1.3), t=-7.96, p <0.001	T-tests	The PTSD group demonstrated lower scores on cognitive measures when compared to a trauma exposed control group.
Burri et al., (2013)	Neuropsychological performance (MMSE: overall cognitive function including tests of orientation, attention, memory, language; SISCO: overall cognitive function including: orientation, memory, intellectual ability)	MMSE: x^2 =9.3, p<0.05; SISCO: x^2 = 10.1, p<0.05. Subdomains: cortical function (x^2 = 12.3, P<0.001); verbal numeracy (x^2= 8.8, p<0.05); construction skills (x^2 = 6.3, p<0.05).	Kruskal-Wallis non-parametric test	Individuals screening positively for PTSD symptoms performed worse on all cognitive tasks compared to controls, independent of whether they reported childhood or adulthood adversity.
Carlson et al., (2008)	Neuropsychological performance (MMSE: overall cognitive function including tests of orientation, attention, memory, language)	MMSE-PTSS-CI: ns MMSE-PTSS-CI-OV: ns	Correlation Analysis	PTSD symptoms were not associated with performance on the MMSE.
Hart et al., (2008)	Neuropsychological performance (NAART: premorbid functioning; Symbol Digit Modalities test: attention, processing speed; COWAT: verbal fluency; Animal Fluency; JLO: visuospatial skills; LMR: logical memory recognition; LMT: logical memory; Trails A,B: processing speed. executive functioning; BNT: naming ability; DSF, DSB: working memory; RAVLT: verbal memory; WRMT: reading ability)	NAART: PTSD: 104.7 (9.0); Comorbid PTSD: 104.6 (9.0); No PTSD: 115.9 (6.9), p=0.02 CAPS Total-NAART: r=-0.45, p<0.01. Symbol Digit: PTSD: 28.0 (7.5), No PTSD: 41.0 (6.7), p<0.05; Trails B: PTSD: 147.2 (36.7); No PTSD: 94.3 (30.3), p<0.05 All other differences between PTSD/ No PTSD:ns	Two-tailed t test, Correlation Analysis, Logistic Regression Analysis	Participants without PTSD demonstrated higher IQ compared to the other groups (PTSD, Comorbid PTSD). PTSD severity correlated with IQ. Participants with PTSD performed worse than those without PTSD in the majority of neuropsychological assessments (apart from Trails A) but not all differences reached statistical significance.

Jelinek et al., (2013)	Neuropsychological performance (PWMT: verbal memory; Digit Span: working memory; Corsi Block Tapping: visuo-spatial memory; Trail Making Test: processing speed. executive functioning)	Ns differences between PTSD, No-PTSD and Non-Exposed groups in all administered assessments. PTSD severity did not correlate with any of the OA neuropsychological test scores (PDS: r=0.22, p<0.15).	ANOVA Correlation Analysis	No evidence for cognitive differences was found between individuals with PTSD and those without PTSD and non-exposed OA. Test performance did not correlate with PTSD
Knight et al., (2017)	Neuropsychological performance (MMSE: overall cognitive function including tests of orientation, attention, memory, language); Subcortical surfaced brain morphometry	MMSE: (PTSD/No PTSD) ns; Increased CAPS scores were related to decreased gray matter volume in a more rostral and inferior left dorsomedial prefrontal cortex region (p < 0.001).	T-test, Multiple Regression	No differences in MMSE scores. PTSD symptom severity was associated with decreased gray matter volume in the left dorsomedial prefrontal cortex.
Qureshi et al., (2010)	Dementia diagnosis	The odds of a dementia diagnosis were two times as high in the PTSD+/PH- group as in the PTSD-/PH+ group (OR=2.0, 95% CI=1.6–2.5, P<.001) or the comparison group (OR=2.3, 95% CI=2.0–2.7, p<.001).	Multivariate Analysis	The incidence and prevalence of dementia was greater in veterans with PTSD compared to controls.
Wittekind et al., (2017)	Neuropsychological performance (Emotional Stroop task: interference effects of emotional material on cognitive processing)	PTSD symptoms-Reaction time for trauma-related words: r=0.41, p=0.005. PTSD symptoms- Reaction time for depression-related, anxiety-related or neutral words: ns. For Trauma related words: PTSD group reaction time-no PTSD reaction time: ns but at trend level p=0.061 (d=0.73).	Pairwise Comparisons, Pearson Correlation	Participants with PTSD symptoms were significantly slower to colour name trauma-related words than non-traumatized participants, and, at trend level, than non-PTSD participants. More severe PTSD symptoms were associated with slower reaction times for trauma-related words (but in no other word conditions).

Yehuda et al., (2004)	Neuropsychological performance (CVLT: verbal learning, memory)	CVLT Learning (Trials 1–5): PTSD: 39.7 (13.6), No PTSD: 47.2 (10.7) ANOVA $F(2,99)= 13.8$, $p<0.001$; All other CVLT domains (free recall, cued recall, recognition) ns	ANOVA, Pairwise Comparisons	The PTSD group performed more poorly than the no PTSD group only on total learning, while the no PTSD group and nonexposed group did not differ on any measure.

Table 4. BNT: Boston Naming Test; California Verbal Learning Test; CAPS = Clinician Administered PTSD Scale; DSF: Digit Span Forward Total Score; DSB: Digit Span Backward Total Score; IQ: Intelligence Quotient; JLO: Judgement of Line Orientation; LMR: Logical Memory Recall score from Weschler Memory Scale-3rd edition; LMT: Logical Memory Thematic score from Weschler Memory Scale-3rd edition; MMSE: Mini Mental State. Examination; OA: Older Adults; PWMT: Penn Word Memory Test; PH: Purple Heart Veterans; PTSS-CI: Posttraumatic Stress Screen for the Cognitively Impaired; PTSS-CI-OV: Posttraumatic Stress Screen for the Cognitively Impaired- Observer version; RAVLT: Rey Auditory Verbal Learning Test; Sisco = Sidam score; WRMT: Warrington Recognition Memory Test (faces subtest).

3.6.3. Personality factors

Personality factor categorisation was based on the five-factor (Big Five) model of personality which includes neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness (Mount, Barrick, & Stewart, 1998). Mindfulness, attachment, self-efficacy, locus of control and self-esteem were also added under this category as per previous research (DiGangi et al., 2013; Eschleman & Bowling, 2009; Gardini, Cloninger, & Venneri, 2009; Giluk, 2009; Hough, 1992) and because of their significant association with the five personality traits (Bohlin, 2003; Giluk, 2009; Noftle & Shaver, 2006; von Collani, 2002).

Personality factors were examined in 10 studies. The most commonly studied personality factors were neuroticism (n=3) and self-efficacy (n=2). Neuroticism refers to a trait disposition to experiencing a number of negative emotions, which include anger, anxiety, irritability and low mood (Widiger & Oltmanns, 2017). Self-efficacy is defined as the degree of belief in one's ability to influence events that affect their lives (Bandura, 2010) .Other factors examined once included self-esteem, mindfulness, inhibited/sensitive personality, attachment style and locus of control. Locus of control is defined as the degree to which people consider outcomes in their lives to be under personal control, or controlled by outside forces (Rotter, 1966). Both studies that examined neuroticism found a significant association with PTSD diagnosis or symptom severity. Mixed results were observed with regards to self-efficacy: In Van Zelst et al., (2003) lack of self-efficacy was associated with increased risk of sub-threshold, but not full, PTSD, while Yehuda et al., (1994) found no significant differences between PTSD and control groups. However, the absence of an association may be due to the small sample size reported in this study (PTSD: N=11; No PTSD N=12), rather to a lack of association per se. For the remaining personality factors, significant relationships were noted between PTSD symptoms and locus of control, attachment style, inhibited and sensitive personality as well as self-esteem (table 5).

Taken together, these findings provide preliminary evidence for an association between personality styles and PTSD symptom severity. Nevertheless, it is important to note that research in this area remains limited as the majority of factors were investigated in single studies.

3.6.4. Physiological factors

Sixteen studies assessed the link between posttraumatic physiological factors and PTSD symptomatology. Seven assessed either subjective health status or functioning, while nine examined the association between the presence of physical problems and PTSD (e.g. cardiovascular disease, pain). The majority of studies assessing subjective health status or functioning (n=5; 71%) showed that these were rated more poorly among older adults with either sub-threshold or full PTSD, compared to control groups.

All studies indicated an association between PTSD and health problems. Participants with full or sub-threshold PTSD experienced more physical problems and being more likely to suffer from specific medical conditions compared to the trauma exposed control groups. It is important to note that in one study (Cooper et al., 2014), the relationship between PTSD and health problems was only positive and significant for specific ethnic populations. However, in this study, the control group comprised of older adults with a diagnosis of depression which is known to affect physical health (Moussavi et al., 2007) and may have accounted for the reported absence of an association.

Table 5: Personality factors

Author	Associated factor	Results	Analysis	Conclusions
Chung et al., (2006)	Locus of control	Internal Health Locus of Control-Avoidance symptoms: r=–0.55, p<0.05; Powerful other Locus of Control- Avoidance symptoms: r=0.65, p<0.05	Correlation Analysis	Internal Health Locus of Control was negatively correlated with PTSD avoidance symptoms. Powerful Other Locus of Control was positively correlated with PTSD avoidance symptoms.
Favaro et al., (2006)	Interpersonal Sensitivity	Interpersonal Sensitivity: ns	One-way ANOVA and Chi square	No differences in interpersonal sensitivity observed in full PTSD, sub PTSD and no PTSD participants.
Gluck et al., (2016)	Mindfulness	Mindfulness-PTSD: ns	Mediation Analysis	The mediation path between mindfulness and PTSD symptoms was not significant.
Hyer et al., (1996)	Personality styles	Inhibited Personality Scale: PTSD: M =64.8, SD=11.8, No PTSD: M=49.9, SD= 12.7; t=4.6, p<.0001. Sensitive Personality Scale: PTSD M=62.2, SD= 12.3, No PTSD M=50.1, SD= 11.9; t=4.6, p<.0001.	T-tests	The PTSD group demonstrated more Inhibited and Sensitive personality styles compared to the no PTSD group.

O'Connor (2010)	Neuroticism	PTSD-Neuroticism: F=10.53, η=476.25 p=0.001;	ANOVA, Hierarchical Regression Analysis	Participants with PTSD experienced more neuroticism two months following trauma than those without PTSD.
Ogle et al., (2016)	Neuroticism, Adult attachment	Neuroticism/PTSD r= .31, p<0.001; Adult Attachment Anxiety/PTSD: r= .39, p<0.001; Attachment avoidance/PTSD: r=.19, p<0.001	Multiple Regression Analysis	Both neuroticism and insecure attachment styles (anxious/avoidant) were associated with PTSD symptom severity.
Ron (2011)	Self-esteem	PTSD/Self-esteem: r= –0.42, p < 0.001.	Correlation Analysis	Negative association between self-esteem and PTSD symptoms emerged.
van Zelst et al., (2003)	Neuroticism, Self-efficacy	Neuroticism Sub PTSD: OR= 2.5; Full PTSD: OR=14.9; Lack of self-efficacy: Sub: OR=2.2	Logistic Regression	Neuroticism was associated with an increase in the risk of PTSD or sub PTSD. Lack of self-efficacy was associated with increased risk of sub PTSD.
Yehuda et al., (1994)	Self-efficacy	No significant differences were observed on the self-efficacy scales (F = 0.89; df= 2,38; ns).	One-way ANOVA (two-tailed), post-hoc testing using the Newman-Keuls test.	No significant differences were observed on the self-efficacy scales between Holocaust survivors with PTSD and Holocaust survivors without PTSD.

Table 5. Df: Degrees of freedom; M: Mean; ns: Not significant; OA: Older Adults; OR: Odds Ratio; PTSD: Posttraumatic Stress Disorder; Sub: Sub-threshold PTSD.

Table 6: Physiological factors

Author	Associated factor	Results	Analysis	Conclusions
Acierno et al., (2006)	Self-rated health problems.	PTSD-Health problems (ρ=0.24, $p<0.01$)	Regression Analysis	Health problems were associated with PTSD symptoms.
Brodaty et al., (2004)	Self-rated physical health	PTSD/No PTSD: χ^2 =39.04, $p<0.001$	Chi square	Participants with PTSD rated their general health more poorly compared to the no PTSD group.
Chung et al., (2008)	Physical Problems	MANOVA (PTSD/Sub PTSD/No PTSD) Physical problems: [F(2, 75)=5.64; $p<0.005$]. Pairwise comparisons: PTSD> no-PTSD and sub PTSD (no-PTSD, $p<0.001$; sub PTSD, $p<0.012$)	MANOVA, Pairwise Comparison	Patients with partial and full-PTSD experienced significantly more physical problems than the trauma exposed control group.
Cooper et al., (2014)	Coronary Artery Disease (CAD)	White: PTSD/CAD: OR=0.90 (0.84, 0.98), $p<0.05$ Black PTSD/CAD: OR=1.29 (1.01, 1.66), $p<0.05$ Hispanic PTSD/CAD: OR=0.65 (0.44, 0.94), $p<0.05$ Asian PTSD/CAD: ns American Indian/ Alaskan Native PTSD/CAD: ns	Logistic Regression	The association of PTSD with CAD varied by race/ethnicity. PTSD was associated with a higher likelihood of CAD, but only among Black people.

Durai et al., (2011)	General health	Cochran Armitage Trend test: General Health: Full PTSD=73.3; Sub PTSD= 56.9, No PTSD=40.5, non-Exposed=43.2 ($z=1.510$, $p<0.001$). Logistic Regression: Sub PTSD-Health: OR=1.8 (95% CI=1.7-2.0); Full PTSD-Health: OR=3.6 (95% CI=2.7-4.9)	Cochran Armitage and Logistic Regression	Veterans with PTSD symptoms were more likely to report poor general health than those with no trauma history or those with history of trauma but no symptoms. Full PTSD was associated with poorer health outcomes than Sub PTSD.
Falger al., (1992)	Cardiovascular risk	Differences between groups (PTSD/No PTSD): Hypertension, Prior MI: ns. Angina Pectoris: PTSD group 31%, No PTSD group 14%, $p<0.05$	T-test, Chi squared, ANOVA	Increased prevalence of some cardiovascular risk factors (angina pectoris) but not others (MI, hypertension) was found in veterans with PTSD compared to the no PTSD group.
Glaesmer et al., (2011)	Physical mobility. Health care utilisation	Asthma (PTSD/No PTSD) OR=2.54 (1.23-5.26), $p<0.05$; Back pain OR=2.20 (1.29-3.76), $p<0.01$; Bronchitis or COPD OR=2.25 (0.99-4.64), $p<0.01$; Cancer (within the last 5 y) OR=3.61 (1.59-8.18), $p<0.01$; Elevated Cholesterol level OR=3.76 (2.11-6.70), $p<0.001$; Congestive heart failure OR=2.94 (1.67-5.17), $p<0.001$; Hard of hearing OR=2.18 (1.25-3.81), $p<0.01$; Hypertension OR= 3.53 (1.89-6.89), $p<0.001$; Osteoporosis 2.29 (1.24-4.23), $p<0.01$; Poor circulation 1.94 (1.14-3.31) $p<0.05$; Rheumatic disease and others 1.41 (0.67-2.95), $p<0.01$; Stomach problems 2.51 (1.41-4.47), $p<0.01$; Thyroid disorder 2.96 (1.54-5.68), $p<0.01$ Ns: Vision problems, Colon problems; Stroke, Diabetes, Osteoarthritis, Overweight. Number of conditions: Non-exposed: 3.2 (2.7); No PTSD: 5.0 (3.6), PTSD: 7.8 (4.2) β (logistic regression) =1.58, $p<0.001$, β (linear regression) =2.84, $p<0.001$	Chi squared, Logistic Regression, Linear Regression	The PTSD group demonstrated an increased risk for the majority of the medical conditions under study compared with the no PTSD and non-exposed groups. Number of conditions was also associated with PTSD.

Hall (2014)	Self-reported physical function and physical performance	MANOVA: Physical function: estimate=-8.96, SE=3.30, p=0.01; Role Physical: estimate=-22.28, SE (5.62); p<0.01; General Health: estimate=-9.01, SE=2.89, p<0.01; Bodily pain: ns. Significant differences between groups (PTSD/No PTSD) on Physical Function, Role-Physical, Bodily Pain, General Health and Physical Performance, p<0.001	MANOVA, Chi squared, T-test	PTSD was negatively associated with self-reported physical function, functioning in daily activities, and general health. Participants with PTSD rated aspects of their general health more poorly, compared to the no PTSD group. Veterans with PTSD demonstrated poorer physical performance than those without PTSD.
Hauser et al., (2012)	Pain	PTSD-Pain OR=3.43; C.I. 1.88–6.26; B=1.23; p<0.0001	Stepwise Hierarchical Logistic Regression	PTSD was a significant predictor of widespread pain
Hyer et al., (1999)	Subjective Health status	PTSD-Health Status: R^2 =.35, Adjusted R^2 .34, F=1.02, ns	Regression Analysis	PTSD was not associated with health status
Kang et al., (2006)	Cardiovascular disease	Circulatory disease-PTSD: OR, 1.58; 95% CI=1.43–1.74 Hypertension-PTSD: OR, 1.25; 95% CI=1.16–1.35 CIHD-PTSD OR, 1.19; 95% CI=1.11–1.29	Odds Ratio	POWs diagnosed with PTSD had increased risk of all circulatory diseases, CIHD, and hypertension compared to POWs with no diagnosis of PTSD.
Kiphuth et al., (2014)	Physical QoL	Differences between PTSD and No PTSD groups in terms of physical Qol ns	Mann–Whitney U test	PTSD group did not differ from no PTSD group in terms of Physical Qol

		Number of comorbidities: PTSD (17.7; SD=6.1); No PTSD (14.1; SD=5.2; p < 0.001)		
Mc Leay et al., (2017)	Physical Health Conditions	Myocardial infarction: OR= 4.43, p=0.006; Fatty liver OR=4.1, p= 0.01; Gastroesophageal reflux OR=2.53, p=0.001; Irritable bowel syndrome OR=2.48, p=0.015; Obstructive sleep apnoea OR=2.83, p< 0.001; Obstructive sleep apnoea, high risk Berlin category OR=2.82, p< 0.001	Odds Ratio	Participants with cardiovascular, liver, gastrointestinal and sleep problems were more likely to have PTSD. The mean total number of comorbidities was higher among those with PTSD than in trauma-exposed controls.
Pietrzak et al., (2012a)	Physical Health Conditions	Subjective Health: PTSD<No PTSD, Chi square: 18.91 (2,65), p<0.001; PTSD vs No PTSD: Arteriosclerosis OR=1.1 (0.66–1.79); Hypertension OR=1.3 (1.03–1.70); Diabetes mellitus OR=1.1 (0.86–1.46); Cirrhosis OR=0.2 (0.03–1.73); Noncirrhotic liver disease OR=1.1 (0.46–2.64); Angina pectoris OR=1.5 (1.11–2.10); Tachycardia OR=1.6 (1.11–2.21); Myocardial OR=1.2 (0.62–2.48); Hypercholesterolemia OR=0.9 (0.76–1.18); Other heart disease OR=1.5 (1.06–2.18); Stomach ulcer OR=1.8 (1.12–2.97); Gastritis OR= 1.8 (1.27–2.66); Arthritis OR=1.4 (1.09–1.84); Stroke OR=1.2 (0.56–2.51). In all analyses p<.05	Chi square; Multivariate Linear Regression	PTSD was associated with greater odds of hypertension, angina pectoris, tachycardia, other heart disease, stomach ulcer, gastritis, and arthritis.
van Zelst et al., (2003)	Physical health	Poor subjective health- Sub PTSD OR=2.2 (1.3–3.6), p<.05	Logistic Regression	Poor subjective health was associated with an increase in the risk of sub-threshold PTSD

van Zelst et al., (2006)	Physical health	PTSD symptoms-Perceived health: OR=2.3 (1.4-3.9), p<0.05). Adjusted for age, sex, marital status, education, urbanization, chronic diseases, functional limitations, social network size, and cognitive functioning.	Odds Ratio	Perceived health was associated with PTSD symptoms, even when adjusted for chronic diseases, functional limitations and other covariates.

Table 6. CAD: Coronary artery disease; CIHD: Chronic Ischemic Heart Disease; COPD: Chronic Obstructive Pulmonary Disorder; Df: Degrees of freedom; NS: Not significant; OA: Older Adults; OR: Odds Ratio; PTSD: Posttraumatic Stress Disorder; QoL: Quality of Life; Sub: Sub-threshold PTSD.

In summary, most reviewed studies showed a relationship between posttraumatic physiological factors and PTSD symptom severity, with older adults with full or sub-threshold PTSD experiencing worse subjective health, more physical problems and being more likely to have specific medical conditions compared to the trauma exposed control groups (table 6).

3.6.5. Psychopathological factors

The relationship between PTSD symptomatology and concurrent psychopathological factors was examined in twelve studies. Eleven studies included data on depression, seven on anxiety, one on OCD, while four investigated the relationship between somatoform symptoms and PTSD. All reviewed studies indicated an association between PTSD and comorbid depression or anxiety. Participants with PTSD experienced significantly more anxiety and depression symptoms when compared to either the sub-threshold PTSD or to the control groups. Even though differences emerged in regard to the measurement of the comorbid conditions, this did not affect the observed relationships. Only half of the studies investigating somatoform symptoms yielded a significant association (Glaesmer et al., 2012; Kuwert et al., 2012), however a failure to observe this relationship in the remaining studies (Favaro, Tenconi, Colombo, & Santonastaso, 2006; Spitzer et al., 2008) may have been due to the studies being underpowered (PTSD sample sizes ranged from n=13 to n=20), rather than due to an absence of the association itself.

Overall, the relationship between PTSD and concurrent psychopathological factors was documented fairly consistently in the majority of included research. Further information on this relationship can be found in table 7.

3.6.6. Social factors

The association between PTSD and social factors was examined in 17 studies. More than half of these (n=10; 59%) investigated the association between social or emotional support and

PTSD severity. Other social factors included were loneliness (n=4; 24%), the degree of social activity (n=2; 12%), and quality of social disclosure (n=2; 12%). Further variables explored by a single study were network size, satisfaction with social life, social dysfunction and relationship satisfaction. The majority of studies (n=13; 76%) supported a negative association between social variables and PTSD (Acierno et al., 2006; Beal, 1995; Brodaty et al., 2004; Chen et al., 2012; Chung et al., 2004; Cook et al., 2004; Durai et al., 2011; Krammer et al., 2016; Ogle et al., 2014, 2016; O'Connor, 2010; Schnurr et al., 2000). Participants with PTSD tended to rate areas associated with social life, support and activity more poorly when compared to those without PTSD (Brodaty et al., 2004; Durai et al., 2011). In addition, lower levels of social support were noted by participants with full PTSD compared to those with sub-threshold PTSD (Durai et al., 2011). Older adults with PTSD were also more likely to report greater degree of social dysfunction, marital distress, relationship dissatisfaction and dysfunctional disclosure (Cook et al., 2004; Krammer et al., 2016; Schnurr, Spiro, & Paris, 2000). Finally, loneliness was associated with an increased risk of PTSD symptoms (van Zelst et al., 2006) and sub-threshold PTSD (Van Zelst et al., 2003; van Zelst et al., 2006).

Table 7: Psychopathological Factors

Author	Associated factor	Results	Analysis	Conclusions
Beal (1995)	Anxiety, Depression	Depression: T1: PTSD=83.2, No PTSD: 46.6, χ^2(df)=28.71 (1), p<0.001 T2: PTSD=86.0, No PTSD: 47.3, χ^2(df)=31.72 (1), p<0.001 Anxiety: T1: PTSD= 76.8, No PTSD:53.4, χ^2(df)=11.88 (1), p<0.001 T2: PTSD= 77.9, No PTSD:54.5, χ^2(df)=11.70 (1), p<0.001	Chi square	Significant differences in anxiety and depression rates were observed between the PoW PTSD and no PTSD groups at times 1 and 2.
Chung et al., (2008)	Anxiety, Depression	MANOVA: Significant differences between groups were found in anxiety [F(2, 75)=9.28; p<0.001] and depression [F(2, 75)=7.56; p<0.001]. Pairwise comparisons: Anxiety: PTSD>No PTSD, sub PTSD (no-PTSD: p<0.001; Sub PTSD: p<0.016), Depression: PTSD>No PTSD, Sub PTSD (no-PTSD, p<0.001; sub PTSD, p<0.003).	MANOVA, Pairwise Comparison	Patients with subthreshold and full-PTSD experienced significantly more anxiety and depression than the trauma exposed control group.
Chung et al., (2009)	Anxiety, Depression	PTSD (t1) was associated with Anxiety (t1) (τ=0.61, p<0.01) and Depression (t1) (τ=0.27, p<0.05). PTSD diagnosis (t2) was associated with Anxiety (t2) (τ=0.36, p<0.01) and Depression (t2) (τ=0.30, p<0.01). PTSD diagnosis (t3) was associated with Anxiety (t3) (τ=0.30, p<0.01), and Depression (t3) (τ=0.28, p<0.01).	Bivariate Association	Anxiety and depression were associated with PTSD diagnosis at each assessment measurement (t1, t2, t3)

		Depression: χ^2=11.11; df = 2; p<0.005);		
Favaro et al., (2006)	Anxiety, Depression, Somatisation, OCD	Somatization: ns; Depression F(2,63)=10.13 p< 0.0003, PTSD > Sub PTSD, No PTSD; OCD: F(2,63)=7.49, p=0.002 PTSD > Sub PTSD, No PTSD; Anxiety F(2,63)=6.52 0.003 PTSD > Sub PTSD, No PTSD	One-way ANOVA, Chi square	Current major depression and anxiety were significantly more frequent in full PTSD subjects than among those with subthreshold PTSD and those without.
Glaesmer et al., (2012)	Depressive symptoms, Somatoform Symptoms	PTSD- Somatoform syndrome (OR=8.184, p<0.001); PTSD- Major Depressive Syndrome: OR=4.053, p<0.001;	Binary Logistic Regression Analysis	PTSD symptoms were significantly associated with comorbid conditions. Strongest association was found for somatoform syndrome.
Kidson et al., (1993)	Anxiety, Depression	Significant differences between groups (PTSD/No PTSD): Anxiety: t=4.61, p<0.001; Depression: t=5.19, p<0.001	T-test	The PTSD group exhibited significantly higher levels of anxiety and depression when compared to the no PTSD group.
Kiphuth et al., (2014)	Anxiety, Depression	Significant differences between groups (PTSD/No PTSD): Anxiety (u=316.5, z=-4.115, p<0.001); Depression (u=608, z=-4.115, p<0.001)	Mann–Whitney U test	TIA patients with PTSD were more likely to show signs of anxiety and depression.
Knight et al., (2017)	Depression	Depressive symptoms-PTSD severity: r = 0.341, p = 0.044.	Multiple Regression	PTSD symptomatology positively correlated with depression severity.

Kuwert et al., (2012)	Somatoform symptoms	PTSD-Somatoform symptoms: linear regression: β=0.271, t=11.408, p= 0.000; logistic regression: OR (CI) =6.12 (3.21-11.64), p=0.000	Linear and Logistic Regression Analyses	PTSD diagnosis was positively associated with somatoform symptoms.
O'Donnell et al., (2006)	Depression	PTSD- Depression: r=.78, p<0.01	Correlation Analysis	PTSD was significantly associated with depression
Spitzer et al., (2008)	Anxiety, Depression, Somatisation	Depression-PTSD: OR=9.28, p<0.001; Anxiety-PTSD: OR=7.01, p<0.001; Somatisation-PTSD: Not significant	ANOVA, Chi square	A lifetime diagnosis of PTSD was associated with symptoms of depression and anxiety.
Yehuda et al., (1994)	Depressive Symptoms	Depressive symptoms: PTSD:19.45 (9.65); No PTSD: 7.90 (8.14), F = 14.4; df =2,38; p < .0001	One-way ANOVA (two-tailed).	The mean score on the depressive subscale was significantly higher for Holocaust survivors with PTSD compared to Holocaust survivors without PTSD.

Table 7: CI: Confidence Intervals; Df: Degrees of freedom; NS: Not significant; OA: Older Adults; OCD: Obsessive Compulsive Disorder; OR: Odds Ratio; PoW: Prisoners of War; PTSD: Posttraumatic Stress Disorder; QoL: Quality of Life; Sub: Sub-threshold PTSD; T1-T3: Assessment time.

Table 8: Social factors

Author	Associated factor	Results	Analysis	Conclusions
Acierno et al., (2006)	Social support	PTSD-Social support (ρ=-0.19, p<0.01)	Regression Analysis	Social support was associated with PTSD symptoms.
Beal (1995)	Loneliness	T1: PTSD: 69.5, No PTSD: 42.7, χ^2=14.33, p<0.001 T2: PTSD: 72.1, No PTSD: 42.9, χ^2=16.83, p<0.001	Chi square	Significant differences in loneliness rates were observed between the PoW PTSD and no PTSD groups at times 1 and 2.
Brodaty et al., (2004)	Social Activity, Satisfaction with social life	PTSD/No PTSD: Social activity t=9.16, p <0.001; Satisfaction with social life: χ^2=41.66, p<0.001 Marital status: ns; Living arrangements: ns;	Chi square, T-tests	Significant differences between the PTSD and No PTSD groups emerged in terms of social activity and social life, with the PTSD group rating these areas more poorly.
Chen et al., (2012)	Social support	Multivariate logistic regression: Low social support b=0.60, p=0.02; Bivariate logistic regression: OR=2.691 (1.027 to 7.048), p=0.03	Multivariate and Bivariate Logistic Regression	Low social support was associated with PTSD. Participants with low social support were almost 2.5 times more likely to have a diagnosis of PTSD.

Chung et al., (2008)	Social dysfunction	MANOVA: Social dysfunction [F(2, 75)=9.17; p<0.001] . Pairwise comparisons: Significant differences in social dysfunction (PTSD/ No PTSD, p<0.001; PTSD/Sub PTSD, p<0.007)	MANOVA, Pairwise Comparison	Patients with sub-threshold and full-PTSD experienced significantly more social dysfunction than the trauma exposed control group.
Cook et al., (2004)	Relationship functioning	Marital distress: $\chi^2(1,N=386)= 19.65$, p<0.001; Relationship satisfaction: t(309)=5.94, p<0.001; Intimacy: t(305)=6.81, p<0.001; Demand–withdraw communication: t(307)=5.08, p<0.001; Constructive communication: t(316)=3.66, p<0.001.	T-test, Chi squared	Ex-POWs with PTSD were more likely to experience marital distress. They also scored significantly lower on all measures of relationship satisfaction compared to the no PTSD group.
Durai et al., (2011)	Social support	Cochran Armitage Trend test: Low Social Support: PTSD= 22.9; Sub PTSD= 8.6, No PTSD=2.9, non-exposed=4.2 (z=1.139, p<0.001). Logistic Regression: Sub PTSD-Low Social Support: OR=2.5 (2.1–3.0), p<.05; PTSD-Low Social Support: OR=7.1 (5.1–9.9), p<.05.	Cochran Armitage Logistic Regression	Veterans with sub-threshold or full PTSD were significantly more likely to report low social support than those with no trauma history or those exposed but with no PTSD. Full PTSD was associated with poorer social support compared to Sub PTSD.
Engdahl et al., (1997)	Social support	Multiple Regression: PTSD-Social Support R=0.14, p<0.01	Multiple Regression	Regression analyses indicated that postmilitary social support was associated with PTSD.
Hyer et al., (1999)	Social support	Ns association between PTSD and Social support	Regression Analysis	Social support from family and friends was not associated with PTSD.

Krammer et al., (2016)	Social acknowledgement, Dysfunctional disclosure	Social acknowledgement as mediator between severity of childhood trauma and CPTSD symptoms Path c'/b1: Anxious arousal: β=.28, p<.05/-.12, F=3.04, p<.05 R^2=.08 Anger/Irritability: β=.17, /-.27 p<.01, F=4.06, p<.01 R^2=.12 Intrusive experiences: β=-.27, p<.01/-.16, F=3.03, p<.05, R^2=.08 Defensive avoidance: β=.21, p<.05/-.30, p<.01, F=5.76 p<.001, R^2=.15 Dissociation: β=.22, p<.05/-.25, p<.01, F=3.81, p<.01, R^2=.11 Impaired self-reference: β=.17/-.28, p<.01, F=3.40, p<.01, R^2=.10 Dysfunctional disclosure as mediator between severity of childhood trauma and CPTSD symptoms Path c'/b1: Anxious arousal: β=.24, p<.01/.32, p<.001, F=5.72, p<.001, R^2=.17 Anger/Irritability: β=.17 /.21 p<.01, F=3.00, p<.05 R^2=.08 Intrusive experiences: β=-.27, p<.01/-.16, F=3.03, p<.05, R^2=.08 Defensive avoidance: β=.19, p<.05/.43, p<.001, F=9.59 p<.001, R^2=.28 Dissociation: β=.24, p<.05/.35, p<.001, F=6.31, p<.001, R^2=.19 Impaired self-reference: β=.15/.33, p<.001, F=4.12, p<.01, R^2=.12	Mediation Analysis	There was evidence for mediation in each mediation model, whereby the critical path c' became nonsignificant or the association was reduced following the insertion of one of the two mediators. Social acknowledgment partially mediated the relationship between trauma and anger/irritability, and impaired self-reference; Analogous results were obtained for dysfunctional disclosure.
O'Connor (2010)	Social support Loneliness	Interpersonal factors/PTSD symptoms: R^2=0.20; Loneliness/PTSD: F=5.86, η=19.66, p= 0.02; Social support/PTSD: F= 9.96, η=251.30, p= 0.002	Linear and Hierarchical Regression Analysis	Interpersonal factors at time 1 predicted 20% of PTSD symptoms at time 4.

Ogle et al., (2014)	Social support	Social support/ PTSD severity: r=.25, p<0.001. Hierarchical regression: Social support explained 17% of symptom variance, R^2=0.17	Hierarchical Regression Analysis/ Correlations	Social support emerged as a predictor of PTSD symptom severity.
Ogle et al., (2016)	Social support	Social support/PTSD r= –.25, p<0.001	Correlation Analysis	Social support was negatively associated with PTSD symptom severity
Schnurr et al., (2000)	Disclosure	Prohibited disclosure: PTSD/No PTSD: OR= 4.38, p<0.001; Sub PTSD/ No PTSD: OR=2.42, p<0.05	Logistic Regression	Veterans with full PTSD were more likely to have experienced prohibited disclosure compared to veterans with sub-threshold PTSD. Veterans with sub-threshold PTSD were more likely to experience prohibited disclosure compared to the no PTSD group.
van Zelst et al., (2003)	Social factors Network size, Emotional support Loneliness	Network size: Sub PTSD OR(CI)=1.6 (1.0–2.7) ns, PTSD OR(CI)=0.9(0.3–2.9) ns Emotional support: Sub PTSD OR(CI)=0.6 (0.4–1.1), PTSD OR(CI)= 1.2(0.4–4.0) ns Loneliness: Sub PTSD OR(CI)=3.6 (2,1–6.1), p<0.05; PTSD OR(CI)=1.9(0.6–6.1), p<0.05	Logistic Regression	Emotional support and network size were not associated with an increase in the risk of PTSD or sub PTSD. Loneliness was associated with 3 times higher risk of sub-threshold PTSD.
van Zelst et al.,	Social inactivity,	Social Inactivity: PTSD symptoms OR(CI)= 1.7 0.9–3.2 ns Loneliness: PTSD OR (CI)= 3.2 (0.7–14.6) ns; Sub PTSD OR(CI)=3.2 (1.7–	Logistic	Social inactivity was not associated with an increase in the risk of PTSD symptoms. Loneliness was significantly

(2006)	Loneliness.	5.7), p<0.05; PTSD symptoms OR=2.8 1.5–5., p<0.05	Regression	associated with almost 3 times higher risk of both sub-threshold PTSD and PTSD symptoms.
Zhang et al., (2012)	Social support	Social support: PTSD/No PTSD OR ns	Bivariate Logistic Regression	The interaction between social support and PTSD was not significant.

Table 8: CI: Confidence Intervals; Df: Degrees of freedom; HTQ: Harvard Trauma Questionnaire; NS: Not significant; OA: Older Adults; OR: Odds Ratio; PoW: Prisoners of War; PTSD: Posttraumatic Stress Disorder; QoL: Quality of Life; Sub: Sub-threshold PTSD; T1-T3: Assessment time.

Four studies did not show an association between PTSD and social variables (Hyer, Stanger, & Boudewyns, 1999; Van Zelst et al., 2003; van Zelst et al., 2006; Zhang, Shi, Wang, & Liu, 2012). Differences in the assessment of social support as well as methodological limitations could account for these differences. In particular, sample size limitations in Van Zelst et al., (2003, 2006) may have rendered the study underpowered to yield an association. In addition, in contrast to the majority of studies (Acierno et al., 2006; Chung et al., 2004; Cook et al., 2004; Durai et al., 2011; Krammer et al., 2016; Ogle et al., 2014, 2016; O'Connor, 2010; Schnurr et al., 2000) Zhang et al., (2012) and Hyer et al., (1999) provided a narrower definition of social support. In both these studies social support was defined as exclusively coming from family and friends and may not have been indicative of support from the broader community. Finally, Engdahl et al., (1997) showed a significant, positive association between social support and PTSD symptom severity. However, the authors included the Social Reintegration scale (Laufer, Yager, Frey-Wouters, & Donnellan, 1981) as a measure of social support. This scale assesses veterans' difficulties in readjustment following homecoming and comprises of two indices: a) Feelings of alienation at homecoming and b) Belief that people and government support veterans. The authors do not specify which of the two indices were used in the analysis, thereby making it difficult to draw conclusions regarding the direction of the relationship between PTSD and social support.

In conclusion, all but four studies supported a negative association between social factors and PTSD severity. Participants with PTSD tended to rate their social life more poorly and noted decreased support and activity compared to those without PTSD. Similarly, PTSD diagnosis was associated with greater degree of social dysfunction, marital distress, relationship dissatisfaction and dysfunctional disclosure.

4. Discussion

We systematically reviewed PTSD and CPTSD studies in later life to determine how posttraumatic factors affected the severity of PTSD symptomatology. Forty-nine studies were identified. PTSD associated factors were categorised as follows: 1. Coping and Response Styles; 2. Neuropsychological factors; 3. Personality factors; 4. Physiological factors; 5.

Psychopathological factors; and 6. Social factors. The main findings are discussed in detail below, along with practice implications and recommendations for future research.

4.1. Key findings

Of the factors reviewed, coping/response, physiological and psychopathological factors displayed the most consistent associations with PTSD severity. In regard to the first factor, this review indicated that both maladaptive coping and posttraumatic cognitions were significantly associated with PTSD symptomatology, yielding findings similar to those reported in younger populations (Boals & Schuettler, 2011; Engelhard, van den Hout, & Vlaeyen, 2003; Koo, Nguyen, Gilmore, Blayney, & Kaysen, 2014). Furthermore, a consistent inverse association was observed between physical health and PTSD symptom severity. This is in line with research demonstrating that PTSD-related, biological changes in the hypothalamic-pituitary-adrenal axis and sympathetic-adrenal-medullary system functions influence the development or exacerbation of medical conditions (Gill, Vythilingam, & Page, 2008; Southwick et al., 2005; Yehuda, 2009). Immune changes in PTSD, increasing the risk for peripheral inflammation, as well as behavioural and psychological correlates of PTSD such as poor sleep or substance abuse could also account for this association (Ayaydin et al., 2016; Baker, Nievergelt, & O'Connor, 2012; Elenkov, Iezzoni, Daly, Harris, & Chrousos, 2005). In addition, review findings suggested a link between PTSD and other types of concurrent psychopathology, especially depression and anxiety. This is supported by studies arguing for similar genetic underpinnings for the three disorders (Smoller, 2015) and is consistent with research linking comorbid PTSD to increased illness burden, delayed response to treatment and a poorer prognosis (Campbell et al., 2007; Hegel et al., 2005).

Some evidence was found for relationships between neuropsychological factors and PTSD. Prospective research in younger adults suggests that structural pre-trauma vulnerability and post-trauma neurotoxicity may both account for the neurocognitive deficits observed in individuals suffering from PTSD (Sekiguchi et al., 2013). However, the relationship between PTSD and neuropsychological factors within the older adult population remains unclear. Research in this field is complicated by the wide variation in cognitive performance

independent of PTSD, due to the cognitive deficits associated with healthy aging and/or the presence of neurodegenerative diseases. For example, post-trauma cognitive deficits may be attributed to the presence of dementia/mild cognitive impairment and could explain the failure to observe differences in participants' performance in some of the included studies (Carlson et al., 2008; Jelinek et al., 2013; Knight et al., 2017). Furthermore, it is important to note that all included studies with the exception of Qureshi et al., (2010) compared groups with small sample sizes (n<39), thereby limiting the generalisability of these findings

Although the majority of reviewed studies demonstrated an association between PTSD and personality or social factors, these areas would benefit from further investigation. For example, even though personality variables were fairly consistently associated with PTSD, the majority of these variables was examined once, offering limited insight into the nature and underlying mechanisms of this association. In addition, the negative association between social factors and PTSD was not consistent across studies. This, combined with the heterogeneity of reviewed factors and significant differences in measurement of social support, poses further challenges when attempting to draw conclusions.

4.2. Clinical implications of key findings

4.2.1. Coping strategies and cognitive factors

Strong evidence was found for the role of maladaptive coping and posttraumatic cognitive factors in PTSD severity. Prospective research in adult trauma survivors suggests that maladaptive coping styles are present prior to the traumatic experience (Gil & Caspi, 2006). Since approximately 90% of older adults are likely to experience a traumatic event during their lifetime (Glaesmer et al., 2012; Pietrzak, Goldstein, Southwick, & Grant, 2012b), identifying maladaptive coping strategies may be beneficial in recognising those at risk of developing posttraumatic symptoms. Furthermore, adopting a preventative approach, which focuses on promoting positive coping strategies may be helpful in safeguarding older adults against the development of PTSD. PTSD interventions targeting maladaptive coping strategies could be particularly useful in facilitating recovery.

Given the association between PTSD severity and cognitive factors, interventions with a particular focus on event centrality and sense of coherence could be efficacious in the treatment of PTSD in older adults. These findings may inform the limited but growing literature on the efficacy of cognitive interventions for PTSD in later life (for a review, see Dinnen, Simiola, & Cook, 2015) and could support the development of gerontological treatment models.

4.2.2 Comorbidity considerations

Consistent evidence was found of an inverse relationship between PTSD symptom severity and individuals' health, either mental or physical. These results are particularly concerning as it is known that the consequences of trauma can interfere with people's ability to successfully access the care they require in both physical and mental health settings (NHS Education for Scotland, 2017). Indeed, a recent systematic review showed increased barriers in health utilisation among trauma survivors (Kantor, Knefel, & Lueger-Schuster, 2017). Therefore, adaptations in health services to address barriers to health care access e.g. by reducing mental health stigma, providing information on how to access help and offering support with logistic barriers may be beneficial (Ouimette et al., 2011; Pietrzak, Johnson, Goldstein, Malley, & Southwick, 2009). In addition, it is important that service users' health difficulties are taken into account in psychological assessment, formulation and intervention. For example, gerontological treatment models, which incorporate physical health considerations, similar to the Comprehensive Cognitive Formulation for CBT (Kishita, Laidlaw, Wuthrich, Egan, & Chellingsworth, 2016; Laidlaw & Thompson, 2008; Laidlaw, Thompson, Gallagher-Thompson, & Dick-Siskin, 2003) albeit specific to PTSD, may be particularly helpful. In regard to mental health comorbidity, the adaptation and evaluation of already existing evidence-based interventions for comorbid PTSD (e.g. Walter et al., 2018) within the older adult population would be an appropriate future step in order to offer tailored posttraumatic support.

4.2.3. Neuropsychological considerations

Review findings indicate a possible association between PTSD and neuropsychological factors in older adults. These results call for increased sensitivity to the cognitive needs of individuals with PTSD. Treatment adaptations such as repetition, a slower therapeutic pace or the provision of information in smaller chunks might enhance clinical outcomes (Brenes, Wagener, & Stanley, 2008; Fisher, Drossel, Ferguson, Cherup, & Sylvester, 2008). Clinicians working with trauma exposed older adults may also consider using a cognitive screening measure in the initial stages of therapy to help determine strengths and difficulties. Health promotion interventions aimed at reducing chronic stress may be helpful and could have a positive effect on cognition, although the magnitude of this effect remains unknown.

4.3. Factors with limited evidence base

4.3.1. Complex Posttraumatic Stress Disorder

Of the studies reviewed, only two specifically explored childhood trauma in older adults and none examined CPTSD symptoms, as described in ICD-11(WHO, 2018). Prevalence rates of childhood abuse among adults are noted to range between 12.7% (for sexual abuse) and 36.3% (for emotional abuse) (Stoltenborgh, Bakermans- Kranenburg, Alink, & van Ijzendoorn, 2015) and these rates seem to increase with age (Office of National Statistics, 2018). CPTSD is considered a chronic condition with debilitating impact on individuals' quality of life, relationships and everyday functioning (Palic et al., 2016; Stadtmann, Maercker, Binder, & Schnepp, 2018a, 2018b). In addition, research findings indicate more severe PTSD symptoms in older adults traumatised in childhood, compared to those exposed to adulthood trauma (Böttche et al., 2012). Thus, failure to assess CPTSD correlates in older adults constitutes a significant limitation and highlights gaps in both research and service provision.

4.3.2. Psychosocial correlates of PTSD

Despite the large number of studies included in the review, some psychosocial PTSD correlates received less attention. For example, only one study investigated the relationship between shame and PTSD in older adults, showing a significant association. The central role of shame in PTSD has been extensively documented in younger adults (Beck et al., 2011; Wright, Crawford, & Del Castillo, 2009) and has led to the development of specific interventions which deal directly with shame reduction, such as Compassion Focused Therapy (Gilbert, 2011). Self-Compassion has also been considered a useful treatment target for CPTSD in younger adults, particularly for symptoms of negative self-concept and affect dysregulation (Karatzias et al., 2019). Review findings suggest that compassion focused interventions may potentially be effective with older people experiencing posttraumatic symptoms, although these findings require further empirical confirmation.

In addition, only one study measured the interaction between PTSD and mindfulness. Contrary to research in younger adults (Kratzer et al., 2018; Martin, Bartlett, Reddy, Gonzalez, & Vujanovic, 2018), Glück et al., (2016) did not find a direct, significant association between mindfulness and PTSD. However, mindfulness had an indirect effect on PTSD via its effects on posttraumatic cognitions. These results, although preliminary, are promising and suggest that the incorporation of mindfulness techniques in PTSD interventions for older adults may indirectly influence a reduction in PTSD symptoms. Future research could seek to further explore this relationship and assess the efficacy of mindfulness-based approaches for this population.

Finally, no included studies investigated the interaction between Early Maladaptive Schemas (EMS, Young, Klosko, & Weishaar, 2003) and PTSD symptomatology in older adults. EMS have been considered a significant predictor of PTSD in younger populations, irrespective of trauma type (Karatzias, Jowett, Begley, & Deas, 2016; Tapia, 2018). A better understanding of the role of EMS in the development and maintenance of PTSD/CPTSD within older adults can inform future interventions for this population.

4.4 Review limitations and recommendations for future research

A number of limitations need to be considered when interpreting the review findings. First, the majority of included studies were cross-sectional, generating an association and not a causal relationship (Sedgwick, 2014). Second, due to the limited research on PTSD in later life, we opted to include a wide range of PTSD studies, with differences in type of trauma exposure, sampling and measurement methods, which may render cross-study comparison difficult. Differences in the definition of PTSD case status or a failure to distinguish between full and sub-threshold PTSD across studies were additional methodological considerations. Fourth, study weaknesses, such as the presence of underpowered or convenience samples, poor case/control differentiation, lack of assessment of confounding variables as well as limited data on diagnostic comorbidity are likely to have affected the internal and external validity of the included studies, thereby impacting on the review findings. Moreover, even though the factor categories were generated based on previous research (DiGangi et al., 2013), it is recognised that they represent broad clusters and may benefit from further operationalisation in order to offer more specific insights into PTSD correlates.

Despite the study limitations, the present investigation is the first to offer a systematic and comprehensive assessment of posttraumatic factors associated with PTSD severity in older adults. Through highlighting some of the domains within the existing literature, which could influence PTSD severity, this review can inform the identification, assessment and treatment of older people in the aftermath of trauma. Specifically, our findings suggest potential treatment modifications such as promoting coping strategies and therapeutically targeting physical and mental health comorbities which may lead to the reduction of PTSD symptoms among older adults. Future gerontological research may seek to incorporate these adaptations into treatment and investigate whether they lead to alleviation of PTSD symptoms. Further, it may be helpful to examine the relative efficacy of different treatment components for PTSD in order to maximise posttraumatic support.

Research including larger cohorts and powered sample sizes may help to obtain more reliable results on PTSD correlates. Similarly, the inclusion of confounding variables could help tease out the relative contribution of different factors on posttraumatic severity. In addition, since variability in the developmental timing or subtype of traumatic exposure has been linked to

differences in PTSD severity among younger populations (Cloitre et al., 2009; Kelley, Weathers, McDevitt- Murphy, Eakin, & Flood, 2009; Sullivan, Fehon, Andres- Hyman, Lipschitz, & Grilo, 2006), it may be particularly interesting to investigate the differential effects of trauma subtypes and timing in posttraumatic symptoms among older adults (e.g. childhood versus adulthood; abuse versus neglect). Future research may also wish to explore the prevalence, correlates and burden of CPTSD in older adults in order to address the needs of this population. Future research may also seek to disambiguate the relationship between PTSD and neurocognitive deficits in later life. The association between posttraumatic psychopathology and psychosocial correlates such as shame, mindfulness or EMS in later life would also benefit from further research. Finally, this review did not address studies focusing on pre- or peri-traumatic factors due to the limited number and high heterogeneity of such studies. Therefore, studies exploring the role of pre- or peri-traumatic factors (e.g. pre-trauma psychopathology, severity of exposure, peritraumatic dissociation) in posttraumatic symptom severity in older adults may be helpful in order to gain a more comprehensive understanding of PTSD and CPTSD correlates.

5. Conclusions

This is the first systematic review to summarise the posttraumatic correlates of PTSD in older adults. While there remains research to be done on PTSD in later life, this study provides recommendations on areas where future interventions and policy decisions could focus on. This includes an emphasis on the treatment needs of individuals with comorbid PTSD (in relation to both physical and mental health), an increased consideration of the cognitive needs of older adults with PTSD as well as a heightened focus on enhancing coping within this population.

6. Journal Appendix A: References to articles included in the systematic review in accordance to author instructions.

1. Acierno, R., Ruggiero, K. J., Kilpatrick, D. G., Resnick, H. S., & Galea, S. (2006). Risk and protective factors for psychopathology among older versus younger adults after the 2004 Florida hurricanes. *Am J Geriatr Psychiatry, 14*(12), 1051-1059. doi:10.1097/01.JGP.0000221327.97904.b0

2. Beal, A. L. (1995). Post-traumatic stress disorder in prisoners of war and combat veterans of the Dieppe Raid: A 50-year follow-up. *The Canadian Journal of Psychiatry / La Revue canadienne de psychiatrie, 40*(4), 177-184.

3. Boals, A., & Schuettler, D. (2011). A double- edged sword: Event centrality, PTSD and posttraumatic growth. *Applied Cognitive Psychology, 25*(5), 817-822.

4. Brodaty, H., Joffe, C., Luscombe, G., & Thompson, C. (2004). Vulnerability to post- traumatic stress disorder and psychological morbidity in aged holocaust survivors. *International Journal of Geriatric Psychiatry, 19*(10), 968-979.

5. Burri, A., Maercker, A., Krammer, S., & Simmen-Janevska, K. (2013). Childhood Trauma and PTSD Symptoms Increase the Risk of Cognitive Impairment in a Sample of Former Indentured Child Laborers in Old Age. *PLOS ONE, 8*(2), e57826. doi:10.1371/journal.pone.0057826

6. Carlson, E. B., Lauderdale, S., Hawkins, J., & Sheikh, J. I. (2008). Posttraumatic stress and aggression among veterans in long-term care. *Journal of geriatric psychiatry and neurology, 21*(1), 61-71.

7. Chen, G., Shen, H., & Chen, G. (2012). A cross-sectional study on posttraumatic stress disorder among elderly Qiang citizens 3 years after the Wenchuan earthquake in China. *The Canadian Journal of Psychiatry, 57*(9), 547-553.

8. Chung, M. C., Berger, Z., Jones, R., & Rudd, H. (2008). Posttraumatic stress and co-morbidity following myocardial infarction among older patients: the role of coping. *Aging and Mental Health, 12*(1), 124-133.

9. Chung, M. C., McKee, K. J., Austin, C., Barkby, H., Brown, H., Cash, S., . . . Pais, T. (2009). Posttraumatic stress disorder in older people after a fall. *International Journal of Geriatric Psychiatry: A journal of the psychiatry of late life and allied sciences, 24*(9), 955-964.

10. Chung, M. C., Preveza, E., Papandreou, K., & Prevezas, N. (2006). Spinal cord injury, posttraumatic stress, and locus of control among the elderly: A comparison with young and middle–aged patients. *Psychiatry: Interpersonal and Biological Processes, 69*(1), 69-80.

11. Cook, J. M., Riggs, D. S., Thompson, R., Coyne, J. C., & Sheikh, J. I. (2004). Posttraumatic stress disorder and current relationship functioning among World War II ex-prisoners of war. *Journal of Family Psychology, 18*(1), 36.

12. Cooper, D. C., Trivedi, R. B., Nelson, K. M., Reiber, G. E., Beaver, K. A., Eugenio, E. C., & Fan, V. S. (2014). Post-traumatic Stress Disorder, Race/Ethnicity, and Coronary Artery Disease Among Older Patients with Depression. *Journal of Racial and Ethnic Health Disparities, 1*(3), 163-170. doi:10.1007/s40615-014-0020-8

13. Durai, U. N. B., Chopra, M. P., Coakley, E., Llorente, M. D., Kirchner, J. E., Cook, J. M., & Levkoff, S. E. (2011). Exposure to trauma and posttraumatic stress disorder symptoms in older veterans attending primary care: Comorbid conditions and self- rated health status. *Journal of the American Geriatrics Society, 59*(6), 1087-1092.

14. Engdahl, B., Dikel, T. N., Eberly, R., & Blank Jr, A. (1997). Posttraumatic stress disorder in a community group of former prisoners of war: a normative response to severe trauma. *American journal of psychiatry, 154*(11), 1576-1581.

15. Falger, P. R. J., den Velde, W. O., Hovens, J. E., Schouten, E. G. W., De Groen, J. H. M., & Van Duijn, H. (1992). Current posttraumatic stress disorder and

cardiovascular disease risk factors in Dutch Resistance veterans from World War II. *Psychotherapy and psychosomatics, 57*(4), 164-171.

16. Favaro, A., Tenconi, E., Colombo, G., & Santonastaso, P. (2006). Full and partial post-traumatic stress disorder among World War II prisoners of war. *Psychopathology, 39*(4), 187-191.

17. Ferrajão, P. C., & Oliveira, R. A. (2016). The effects of combat exposure, abusive violence, and sense of coherence on PTSD and depression in Portuguese colonial war veterans. *Psychological trauma: theory, research, practice, and policy, 8*(1), 1.

18. Glaesmer, H., Brähler, E., Gündel, H., & Riedel-Heller, S. G. (2011). The association of traumatic experiences and posttraumatic stress disorder with physical morbidity in old age: a German population-based study. *Psychosomatic Medicine, 73*(5), 401-406.

19. Glaesmer, H., Kaiser, M., Bräehler, E., Freyberger, H. J., & Kuwert, P. (2012). Posttraumatic stress disorder and its comorbidity with depression and somatisation in the elderly–a German community-based study. *Aging & mental health, 16*(4), 403-412.

20. Glück, T. M., Tran, U. S., Raninger, S., & Lueger-Schuster, B. (2016). The influence of sense of coherence and mindfulness on PTSD symptoms and posttraumatic cognitions in a sample of elderly Austrian survivors of World War II. *International psychogeriatrics, 28*(3), 435-441.

21. Hall, K. S., Beckham, J. C., Bosworth, H. B., Sloane, R., Pieper, C. F., & Morey, M. C. (2014). PTSD is negatively associated with physical performance and physical function in older overweight military Veterans. *Journal of rehabilitation research and development, 51*(2), 285.

22. Hart Jr, M. D. J., Kimbrell, T., Fauver, P., Cherry, B. J., Pitcock, J., Booe, L. Q., . . . Freeman, T. W. (2008). Cognitive dysfunctions associated with PTSD: evidence

from World War II prisoners of war. *The Journal of Neuropsychiatry and Clinical Neurosciences, 20*(3), 309-316.

23. Hyer, L., & Boyd, S. (1996). Personality scales as predictors of older combat veterans with posttraumatic stress disorder. *Psychological reports, 79*(3), 1040-1042.

24. Hyer, L., Stanger, E., & Boudewyns, P. (1999). The interaction of posttraumatic stress disorder and depression among older combat veterans. *Journal of clinical psychology, 55*(9), 1073-1083.

25. Häuser, W., Glaesmer, H., Schmutzer, G., & Brähler, E. (2012). Widespread pain in older Germans is associated with posttraumatic stress disorder and lifetime employment status–results of a cross-sectional survey with a representative population sample. *PAIN®, 153*(12), 2466-2472.

26. Jelinek, L., Wittekind, C. E., Moritz, S., Kellner, M., & Muhtz, C. (2013). Neuropsychological functioning in posttraumatic stress disorder following forced displacement in older adults and their offspring. *Psychiatry research, 210*(2), 584-589.

27. Kang, H. K., Bullman, T. A., & Taylor, J. W. (2006). Risk of selected cardiovascular diseases and posttraumatic stress disorder among former World War II prisoners of war. *Annals of epidemiology, 16*(5), 381-386.

28. Kidson, M. A., Douglas, J. C., & Holwill, B. J. (1993). Post-traumatic stress disorder in Australian World War II veterans attending a psychiatric outpatient clinic. *The Medical journal of Australia, 158*(8), 563-566.

29. Kiphuth, I. C., Utz, K. S., Noble, A. J., Köhrmann, M., & Schenk, T. (2014). Increased prevalence of posttraumatic stress disorder in patients after transient ischemic attack. *Stroke, 45*(11), 3360-3366.

30. Knight, L. K., Naaz, F., Stoica, T., Depue, B. E., & Alzheimer's Disease Neuroimaging, I. (2017). Lifetime PTSD and geriatric depression symptomatology

relate to altered dorsomedial frontal and amygdala morphometry. *Psychiatry Research: Neuroimaging, 267*, 59-68.

31. Krammer, S., Kleim, B., Simmen-Janevska, K., & Maercker, A. (2016). Childhood trauma and complex posttraumatic stress disorder symptoms in older adults: A study of direct effects and social-interpersonal factors as potential mediators. *Journal of Trauma & Dissociation, 17*(5), 593-607. doi:10.1080/15299732.2014.991861

32. Kuwert, P., Braehler, E., Freyberger, H. J., & Glaesmer, H. (2012). More than 60 years later: the mediating role of trauma and posttraumatic stress disorder for the association of forced displacement in World War II with somatization in old age. *The Journal of nervous and mental disease, 200*(10), 911-914.

33. Leskela, J., Dieperink, M., & Thuras, P. (2002). Shame and posttraumatic stress disorder. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies, 15*(3), 223-226.

34. McLeay, S. C., Harvey, W. M., Romaniuk, M. N., Crawford, D. H., Colquhoun, D. M., Young, R. M., . . . Cooksley, G. (2017). Physical comorbidities of post-traumatic stress disorder in Australian Vietnam War veterans. *Med J Aust, 206*(6), 251-257.

35. Ogle, C. M., Rubin, D. C., & Siegler, I. C. (2014). Cumulative exposure to traumatic events in older adults. *Aging & mental health, 18*(3), 316-325.

36. Ogle, C. M., Rubin, D. C., & Siegler, I. C. (2016). Maladaptive trauma appraisals mediate the relation between attachment anxiety and PTSD symptom severity. *Psychological trauma: theory, research, practice, and policy, 8*(3), 301.

37. O'Connor, M. (2010). PTSD in older bereaved people. *Aging & mental health, 14*(6), 670-678.

38. Pietrzak, R. H., Goldstein, R. B., Southwick, S. M., & Grant, B. F. (2012a). Physical health conditions associated with posttraumatic stress disorder in U.S. older

adults: results from wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of the American Geriatrics Society, 60*(2), 296-303. doi:10.1111/j.1532-5415.2011.03788.x

39. Posttraumatic stress disorder in elderly and younger adults after the 1988 earthquake in Armenia. (1994). *American Journal of Psychiatry, 151*(6), 895-901. doi:10.1176/ajp.151.6.895

40. Qureshi, S. U., Kimbrell, T., Pyne, J. M., Magruder, K. M., Hudson, T. J., Petersen, N. J., . . . Kunik, M. E. (2010). Greater Prevalence and Incidence of Dementia in Older Veterans with Posttraumatic Stress Disorder: [See editorial comments by Dr. Soo Borson, pp 1797- 1798]. *Journal of the American Geriatrics Society, 58*(9), 1627-1633.

41. Ron, P. (2011). Intergenerational transmission, attitudes, and post-traumatic stress disorder in times of war: A comparison between elderly people and their adult offspring after the Second Lebanon War (2006) and Casting Lead Operation (2008). *Illness, Crisis & Loss, 19*(4), 329-349.

42. Schnurr, P. P., Spiro Iii, A., & Paris, A. H. (2000). Physician-diagnosed medical disorders in relation to PTSD symptoms in older male military veterans. *Health Psychology, 19*(1), 91.

43. Spitzer, C., Barnow, S., Völzke, H., John, U., Freyberger, H. J., & Grabe, H. J. (2008). Trauma and posttraumatic stress disorder in the elderly: findings from a German community study. *The Journal of clinical psychiatry*.

44. Van Zelst, W. H., de Beurs, E., Beekman, A. T. F., Deeg, D. J. H., & van Dyck, R. (2003). Prevalence and risk factors of posttraumatic stress disorder in older adults. *Psychotherapy and Psychosomatics, 72*(6), 333-342.

45. van Zelst, W. H., de Beurs, E., Beekman, A. T. F., van Dyck, R., & Deeg, D. D. H. (2006). Well- being, physical functioning, and use of health services in the

elderly with PTSD and sub-threshold PTSD. *International Journal of Geriatric Psychiatry*, *21*(2), 180-188.

46. Wittekind, C. E., Muhtz, C., Moritz, S., & Jelinek, L. (2017). Performance in a blocked versus randomized emotional Stroop task in an aged, early traumatized group with and without posttraumatic stress symptoms. *Journal of behavior therapy and experimental psychiatry, 54*, 35-43.

47. Yehuda, R., Golier, J. A., Halligan, S. L., & Harvey, P. D. (2004). Learning and memory in Holocaust survivors with posttraumatic stress disorder. *Biological Psychiatry*, *55*(3), 291-295.

48. Yehuda, R., Kahana, B., Southwick, S. M., & Giller, E. L. (1994). Depressive features in holocaust survivors with post-traumatic stress disorder. *Journal of Traumatic Stress, 7*(4), 699-704. doi:10.1007/BF02103016

49. Zhang, Z., Shi, Z., Wang, L., & Liu, M. (2012). Post- traumatic Stress Disorder, Anxiety and Depression among the Elderly: A Survey of the Hard- hit Areas a Year after the Wenchuan Earthquake. *Stress and Health, 28*(1), 61-68.

7. References

Acierno, R., Ruggiero, K. J., Kilpatrick, D. G., Resnick, H. S., & Galea, S. (2006). Risk and protective factors for psychopathology among older versus younger adults after the 2004 Florida hurricanes. *Am J Geriatr Psychiatry, 14*(12), 1051-1059. doi:10.1097/01.JGP.0000221327.97904.b0

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)* (0890425574). Washington, DC: American Psychiatric Publishing.

Antonovsky, A. (1993). The structure and properties of the sense of coherence scale. *Social science & medicine, 36*(6), 725-733. doi:10.1016/0277-9536(93)90033-Z

Averill, P. M., & Beck, J. G. (2000). Posttraumatic stress disorder in older adults: a conceptual review. *J Anxiety Disord, 14*(2), 133-156. doi: 10.1016/S0887-6185(99)00045-6

Ayaydin, H., Abali, O., Akdeniz, N. O., Kok, B. E., Gunes, A., Yildirim, A., & Deniz, G. (2016). Immune system changes after sexual abuse in adolescents. *Pediatrics international, 58*(2), 105-112. doi: 10.1111/ped.12767

Baker, D. G., Nievergelt, C. M., & O'Connor, D. T. (2012). Biomarkers of PTSD: neuropeptides and immune signaling. *Neuropharmacology, 62*(2), 663-673. doi:10.1016/j.neuropharm.2011.02.027

Bandura, A. (2010). Self-efficacy. *The Corsini encyclopedia of psychology*, 1-3.

Beal, A. L. (1995). Post-traumatic stress disorder in prisoners of war and combat veterans of the Dieppe Raid: A 50-year follow-up. *The Canadian Journal of Psychiatry / La Revue canadienne de psychiatrie, 40*(4), 177-184. doi:10.1177/070674379504000404

Beck, J. G., McNiff, J., Clapp, J. D., Olsen, S. A., Avery, M. L., & Hagewood, J. H. (2011). Exploring negative emotion in women experiencing intimate partner violence: Shame, guilt, and PTSD. *Behavior therapy, 42*(4), 740-750. doi:10.1016/j.beth.2011.04.001

Benjet, C., Bromet, E., Karam, E. G., Kessler, R. C., McLaughlin, K. A., Ruscio, A. M., ... & Alonso, J. (2016). The epidemiology of traumatic event exposure worldwide: results from the World Mental Health Survey Consortium. *Psychological medicine*, *46*(2), 327-343.

Berntsen, D., & Rubin, D. C. (2006). The Centrality of Event Scale: A Measure of Integrating a Trauma into One's Identity and its Relation to Post-Traumatic Stress Disorder Symptoms. *Behaviour research and therapy*, *44*(2), 219-231. doi:10.1016/j.brat.2005.01.009

Boals, A., & Schuettler, D. (2011). A double- edged sword: Event centrality, PTSD and posttraumatic growth. *Applied Cognitive Psychology, 25*(5), 817. doi:10.1002/acp.1753

Bohlin, G. (2003). Early temperament and attachment as predictors of the Five Factor Model of personality. *Attachment & Human Development, 5*(1), 2-18. doi:10.1080/1461673031000078643

Brenes, G. A., Wagener, P., & Stanley, M. A. (2008). Treatment of late-life generalized anxiety disorder in primary care settings. In Gallagher-Thompson, D., Steffen, A., Thompson, L., (eds) *Handbook of behavioral and cognitive therapies with older adults* (pp. 33-47). New York: Springer.

Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *J Consult Clin Psychol, 68*(5), 748-766.

Brodaty, H., Joffe, C., Luscombe, G., & Thompson, C. (2004). Vulnerability to post- traumatic stress disorder and psychological morbidity in aged holocaust survivors. *International Journal of Geriatric Psychiatry, 19*(10), 968-979. doi: 10.1002/gps.1195

Burri, A., Maercker, A., Krammer, S., & Simmen-Janevska, K. (2013). Childhood Trauma and PTSD Symptoms Increase the Risk of Cognitive Impairment in a Sample of Former Indentured Child Laborers in Old Age. *PLOS ONE, 8*(2), e57826. doi:10.1371/journal.pone.0057826

Böttche, M., Kuwert, P., & Knaevelsrud, C. (2012). Posttraumatic stress disorder in older adults: an overview of characteristics and treatment approaches. *International journal of geriatric psychiatry, 27*(3), 230-239. doi:10.1002/gps.2725

Campbell, D. G., Felker, B. L., Liu, C.-F., Yano, E. M., Kirchner, J. E., Chan, D., . . . Chaney, E. F. (2007). Prevalence of Depression–PTSD Comorbidity: Implications for

Clinical Practice Guidelines and Primary Care-based Interventions. *Journal of General Internal Medicine, 22*(6), 711-718. doi:10.1007/s11606-006-0101-4

Carlson, E. B., Lauderdale, S., Hawkins, J., & Sheikh, J. I. (2008). Posttraumatic stress and aggression among veterans in long-term care. *Journal of geriatric psychiatry and neurology, 21*(1), 61-71. doi:10.1177/0891988707311557

Chatterji, S., Byles, J., Cutler, D., Seeman, T., & Verdes, E. (2015). Health, functioning, and disability in older adults—present status and future implications. *The Lancet, 385*(9967), 563-575. doi:https://doi.org/10.1016/S0140-6736(14)61462-8

Chen, G., Shen, H., & Chen, G. (2012). A cross-sectional study on posttraumatic stress disorder among elderly Qiang citizens 3 years after the Wenchuan earthquake in China. *The Canadian Journal of Psychiatry, 57*(9), 547-553. doi:10.1177/070674371205700905

Chung, M. C., Berger, Z., Jones, R., & Rudd, H. (2008). Posttraumatic stress and co-morbidity following myocardial infarction among older patients: the role of coping. *Aging and Mental Health, 12*(1), 124-133. doi:10.1080/13607860701366152

Chung, M. C., Berger, Z., & Rudd, H. (2008). Coping with posttraumatic stress disorder and comorbidity after myocardial infarction. *Comprehensive Psychiatry, 49*(1), 55-64.

Chung, M. C., McKee, K. J., Austin, C., Barkby, H., Brown, H., Cash, S., . . . Pais, T. (2009). Posttraumatic stress disorder in older people after a fall. *International Journal of Geriatric Psychiatry: A journal of the psychiatry of late life and allied sciences, 24*(9), 955-964.

Chung, M. C., Preveza, E., Papandreou, K., & Prevezas, N. (2006). Spinal cord injury, posttraumatic stress, and locus of control among the elderly: A comparison with young and middle–aged patients. *Psychiatry: Interpersonal and Biological Processes*, 69(1), 69-80.

Cloitre, M., Stolbach, B. C., Herman, J. L., van der Kolk, B., Pynoos, R., Wang, J., & Petkova, E. (2009). A developmental approach to complex PTSD: childhood and adult cumulative trauma as predictors of symptom complexity. *J Trauma Stress, 22*(5), 399-408. doi:10.1002/jts.20444

Cloitre, M., Garvert, D. W., Brewin, C. R., Bryant, R. A., & Maercker, A. (2013). Evidence for proposed ICD-11 PTSD and complex PTSD: A latent profile analysis. *European journal of psychotraumatology, 4*(1), 20706.

Cook, J. M., McCarthy, E., & Thorp, S. R. (2017). Older Adults with PTSD: Brief State of Research and Evidence-Based Psychotherapy Case Illustration. *The American Journal of Geriatric Psychiatry, 25*(5), 522-530. doi:10.1016/j.jagp.2016.12.016

Cook, J. M., Riggs, D. S., Thompson, R., Coyne, J. C., & Sheikh, J. I. (2004). Posttraumatic stress disorder and current relationship functioning among World War II ex-prisoners of war. *Journal of Family Psychology, 18*(1), 36.

Cook, J. M., & Simiola, V. (2017). Trauma and PTSD in older adults: Prevalence, course, concomitants and clinical considerations. *Current Opinion in Psychology, 14*, 1-4.

Cooper, D. C., Trivedi, R. B., Nelson, K. M., Reiber, G. E., Beaver, K. A., Eugenio, E. C., & Fan, V. S. (2014). Post-traumatic Stress Disorder, Race/Ethnicity, and Coronary Artery Disease Among Older Patients with Depression. *Journal of Racial and Ethnic Health Disparities, 1*(3), 163-170. doi:10.1007/s40615-014-0020-8

Cuijpers, P. (2016). *Meta-analyses in mental health research. A practical guide.* Amsterdam: Pim Cuijpers Uitgeverij.

Davison, E. H., Pless, A. P., Gugliucci, M. R., King, L. A., King, D. W., Salgado, D. M., . . . Bachrach, P. (2006). Late-Life Emergence of Early-Life Trauma: The Phenomenon of Late-Onset Stress Symptomatology Among Aging Combat Veterans. *Research on Aging, 28*(1), 84-114. doi:10.1177/0164027505281560

DiGangi, J. A., Gomez, D., Mendoza, L., Jason, L. A., Keys, C. B., & Koenen, K. C. (2013). Pretrauma risk factors for posttraumatic stress disorder: A systematic review of the literature. *Clinical Psychology Review, 33*(6), 728-744. doi:https://doi.org/10.1016/j.cpr.2013.05.002

Dinnen, S., Simiola, V., & Cook, J. M. (2015). Post-traumatic stress disorder in older adults: A systematic review of the psychotherapy treatment literature. *Aging & mental health, 19*(2), 144-150.doi: https://doi.org/10.1080/13607863.2014.920299

Durai, U. N. B., Chopra, M. P., Coakley, E., Llorente, M. D., Kirchner, J. E., Cook, J. M., & Levkoff, S. E. (2011). Exposure to trauma and posttraumatic stress disorder symptoms in older veterans attending primary care: Comorbid conditions and self- rated health status. *Journal of the American Geriatrics Society, 59*(6), 1087-1092. doi:https://doi.org/10.1111/j.1532-5415.2011.03407.x

Elenkov, I. J., Iezzoni, D. G., Daly, A., Harris, A. G., & Chrousos, G. P. (2005). Cytokine dysregulation, inflammation and well-being. *Neuroimmunomodulation*, 12(5), 255-269.

Engdahl, B., Dikel, T. N., Eberly, R., & Blank Jr, A. (1997). Posttraumatic stress disorder in a community group of former prisoners of war: a normative response to severe trauma. *American journal of psychiatry, 154*(11), 1576-1581.

Engelhard, I. M., van den Hout, M. A., & Vlaeyen, J. W. S. (2003). The Sense of Coherence in Early Pregnancy and Crisis Support and Posttraumatic Stress After Pregnancy Loss: A Prospective Study. *Behavioral Medicine, 29*(2), 80-84. doi:10.1080/08964280309596060

Eschleman, K. J., & Bowling, N. A. (2009). Relationships between personality variables and burnout: A meta-analysis AU - Alarcon, Gene. *Work & Stress, 23*(3), 244-263. doi:10.1080/02678370903282600

Falger, P. R. J., den Velde, W. O., Hovens, J. E., Schouten, E. G. W., De Groen, J. H. M., & Van Duijn, H. (1992). Current posttraumatic stress disorder and cardiovascular

disease risk factors in Dutch Resistance veterans from World War II. *Psychotherapy and psychosomatics, 57*(4), 164-171. doi:10.1159/000288594

Favaro, A., Tenconi, E., Colombo, G., & Santonastaso, P. (2006). Full and partial post-traumatic stress disorder among World War II prisoners of war. *Psychopathology, 39*(4), 187-191.

Feder, A., Nestler, E. J., & Charney, D. S. (2009). Psychobiology and molecular genetics of resilience. *Nature Reviews Neuroscience, 10*(6), 446.

Ferrajão, P. C., & Oliveira, R. A. (2016). The effects of combat exposure, abusive violence, and sense of coherence on PTSD and depression in Portuguese colonial war veterans. *Psychological trauma: theory, research, practice, and policy*, 8(1), 1.

Fisher, J. E., Drossel, C., Ferguson, K., Cherup, S., & Sylvester, M. (2008). Treating persons with dementia in context. In *Handbook of behavioral and cognitive therapies with older adults* (pp. 200-218): Springer.

Floyd, M., Rice, J., & Black, S. R. (2002). Recurrence of posttraumatic stress disorder in late life: A cognitive aging perspective. *Journal of Clinical Geropsychology, 8*(4), 303-311.

Gardini, S., Cloninger, C. R., & Venneri, A. (2009). Individual differences in personality traits reflect structural variance in specific brain regions. *Brain Research Bulletin, 79*(5), 265-270. doi:https://doi.org/10.1016/j.brainresbull.2009.03.005

Gilbert, P. (2011). Shame in psychotherapy and the role of compassion focused therapy. Washington, DC, US: American Psychological Association. http://dx.doi.org/10.1037/12326-014

Gil, S., & Caspi, Y. (2006). Personality traits, coping style, and perceived threat as predictors of posttraumatic stress disorder after exposure to a terrorist attack: a prospective study. *Psychosomatic Medicine, 68*(6), 904-909.

Gill, J., Vythilingam, M., & Page, G. G. (2008). Low cortisol, high DHEA, and high levels of stimulated TNF- α, and IL- 6 in women with PTSD. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies*, *21*(6), 530-539.

Giluk, T. L. (2009). Mindfulness, Big Five personality, and affect: A meta-analysis. *Personality and Individual Differences*, *47*(8), 805-811. doi:10.1016/j.paid.2009.06.026

Glaesmer, H., Brähler, E., Gündel, H., & Riedel-Heller, S. G. (2011). The association of traumatic experiences and posttraumatic stress disorder with physical morbidity in old age: a German population-based study. *Psychosomatic Medicine*, *73*(5), 401-406. http://dx.doi.org/10.1097/PSY.0b013e31821b47e8

Glaesmer, H., Kaiser, M., Bräehler, E., Freyberger, H. J., & Kuwert, P. (2012). Posttraumatic stress disorder and its comorbidity with depression and somatisation in the elderly–a German community-based study. *Aging & mental health*, *16*(4), 403-412. doi:10.1080/13607863.2011.615740

Glück, T. M., Tran, U. S., Raninger, S., & Lueger-Schuster, B. (2016). The influence of sense of coherence and mindfulness on PTSD symptoms and posttraumatic cognitions in a sample of elderly Austrian survivors of World War II. *International psychogeriatrics*, *28*(3), 435-441. doi:10.1017/S104161021500143X

Grady, C. L. (2008). Cognitive neuroscience of aging. *Annals of the new york Academy of Sciences*, *1124*(1), 127-144. doi:10.1196/annals.1440.009

Grenade, L., & Boldy, D. (2008). Social isolation and loneliness among older people: issues and future challenges in community and residential settings. *Aust Health Rev*, *32*(3), 468-478.

Hall, K. S., Beckham, J. C., Bosworth, H. B., Sloane, R., Pieper, C. F., & Morey, M. C. (2014). PTSD is negatively associated with physical performance and physical

function in older overweight military Veterans. *Journal of rehabilitation research and development*, 51(2), 285.

Hart Jr, M. D. J., Kimbrell, T., Fauver, P., Cherry, B. J., Pitcock, J., Booe, L. Q., . . . Freeman, T. W. (2008). Cognitive dysfunctions associated with PTSD: evidence from World War II prisoners of war. *The Journal of Neuropsychiatry and Clinical Neurosciences, 20*(3), 309-316.

Hegel, M. T., Unützer, J., Tang, L., Areán, P. A., Katon, W., Noël, P. H., . . . Lin, E. H. B. (2005). Impact of comorbid panic and posttraumatic stress disorder on outcomes of collaborative care for late-life depression in primary care. *The American Journal of Geriatric Psychiatry, 13*(1), 48-58. doi:10.1097/00019442-200501000-00008

Hough, L. M. (1992). The'Big Five'personality variables--construct confusion: Description versus prediction. *Human performance, 5*(1-2), 139-155. doi:10.1080/08959285.1992.9667929

Hyer, L., & Boyd, S. (1996). Personality scales as predictors of older combat veterans with posttraumatic stress disorder. *Psychological reports*, 79(3), 1040-1042.

Hyer, L., Stanger, E., & Boudewyns, P. (1999). The interaction of posttraumatic stress disorder and depression among older combat veterans. *Journal of clinical psychology, 55*(9), 1073-1083.doi:10.1002/(SICI)1097-4679(199909)55:9<1073::AID-JCLP5>3.0.CO;2-O

Häuser, W., Glaesmer, H., Schmutzer, G., & Brähler, E. (2012). Widespread pain in older Germans is associated with posttraumatic stress disorder and lifetime employment status–results of a cross-sectional survey with a representative population sample. *Pain, 153*(12), 2466-2472. doi: https://doi.org/10.1016/j.pain.2012.09.006

Iliffe, S., Kharicha, K., Harari, D., Swift, C., Gillmann, G., & Stuck, A. E. (2007). Health risk appraisal in older people 2: the implications for clinicians and commissioners of social isolation risk in older people. *Br J Gen Pract, 57*(537), 277-282.

Jelinek, L., Wittekind, C. E., Moritz, S., Kellner, M., & Muhtz, C. (2013). Neuropsychological functioning in posttraumatic stress disorder following forced displacement in older adults and their offspring. *Psychiatry research, 210*(2), 584-589. doi: https://doi.org/10.1016/j.psychres.2013.06.037

Johnson, H., & Thompson, A. (2008). The development and maintenance of post-traumatic stress disorder (PTSD) in civilian adult survivors of war trauma and torture: A review. *Clinical psychology review, 28*(1), 36-47. doi: 10.1016/j.cpr.2007.01.017

Joint Commissioning Panel for Mental Health (2013) Guidance for commissioners of older people's mental health services. *Retrieved from https://www.jcpmh.info/.*

Kang, H. K., Bullman, T. A., & Taylor, J. W. (2006). Risk of selected cardiovascular diseases and posttraumatic stress disorder among former World War II prisoners of war. *Annals of epidemiology, 16*(5), 381-386. doi: https://doi.org/10.1016/j.annepidem.2005.03.004

Kantor, V., Knefel, M., & Lueger-Schuster, B. (2017). Perceived barriers and facilitators of mental health service utilization in adult trauma survivors: A systematic review. *Clinical Psychology Review, 52*, 52-68.doi: https://doi.org/10.1016/j.cpr.2016.12.001

Karatzias, Jowett, S., Begley, A., & Deas, S. (2016). Early maladaptive schemas in adult survivors of interpersonal trauma: foundations for a cognitive theory of psychopathology. *European Journal of Psychotraumatology, 7*(1), 30713. doi:10.3402/ejpt.v7.30713

Karatzias, T., Shevlin, M., Fyvie, C., Hyland, P., Efthymiadou, E., Wilson, D., . . . Cloitre, M. (2017). Evidence of distinct profiles of Posttraumatic Stress Disorder (PTSD) and Complex Posttraumatic Stress Disorder (CPTSD) based on the new ICD-11 Trauma Questionnaire (ICD-TQ). *J Affect Disord, 207*, 181-187. doi:10.1016/j.jad.2016.09.032

Karatzias, T., Cloitre, M., Maercker, A., Kazlauskas, E., Shevlin, M., Hyland, P., . . . Brewin, C. R. (2018). PTSD and Complex PTSD: ICD-11 updates on concept and

measurement in the UK, USA, Germany and Lithuania. *European journal of psychotraumatology, 8*(sup7), 1418103-1418103. doi:10.1080/20008198.2017.1418103

Karatzias, T., Hyland, P., Bradley, A., Fyvie, C., Logan, K., Easton, P., . . . Shevlin, M (2019). Is Self-Compassion a Worthwhile Therapeutic Target for ICD-11 Complex PTSD (CPTSD)? *Behavioural and Cognitive Psychotherapy*, 1-13. doi:10.1017/S1352465818000577

Kelley, L. P., Weathers, F. W., McDevitt- Murphy, M. E., Eakin, D. E., & Flood, A. M. (2009). A comparison of PTSD symptom patterns in three types of civilian trauma. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies, 22*(3), 227-235. doi:10.1002/jts.20406

Kidson, M. A., Douglas, J. C., & Holwill, B. J. (1993). Post-traumatic stress disorder in Australian World War II veterans attending a psychiatric outpatient clinic. *The Medical journal of Australia*, 158(8), 563-566.

Kiphuth, I. C., Utz, K. S., Noble, A. J., Köhrmann, M., & Schenk, T. (2014). Increased prevalence of posttraumatic stress disorder in patients after transient ischemic attack. *Stroke, 45*(11), 3360-3366. doi:10.1161/STROKEAHA.113.004459

Kishita, N., Laidlaw, K., Wuthrich, V. M., Egan, S. J., & Chellingsworth, M. (2016). Evidence-based developments of CBT for late life anxiety. *Innovations and Future Directions in the Behavioural and Cognitive Therapies*, 56.

Knight, L. K., Naaz, F., Stoica, T., Depue, B. E., & Alzheimer's Disease Neuroimaging, I. (2017). Lifetime PTSD and geriatric depression symptomatology relate to altered dorsomedial frontal and amygdala morphometry. *Psychiatry Research: Neuroimaging, 267*, 59-68. doi:10.1016/j.pscychresns.2017.07.003

Koo, K. H., Nguyen, H. V., Gilmore, A. K., Blayney, J. A., & Kaysen, D. L. (2014). Posttraumatic cognitions, somatization, and PTSD severity among Asian American

and White college women with sexual trauma histories. *Psychological Trauma: Theory, Research, Practice, and Policy, 6*(4), 337. doi:10.1037/a0033830

Krammer, S., Kleim, B., Simmen-Janevska, K., & Maercker, A. (2016). Childhood trauma and complex posttraumatic stress disorder symptoms in older adults: A study of direct effects and social-interpersonal factors as potential mediators. *Journal of Trauma & Dissociation, 17*(5), 593-607. doi:10.1080/15299732.2014.991861

Kratzer, L., Heinz, P., Pfitzer, F., Padberg, F., Jobst, A., & Schennach, R. (2018). Mindfulness and pathological dissociation fully mediate the association of childhood abuse and PTSD symptomatology. *European Journal of Trauma & Dissociation, 2*(1), 5-10.

Kuwert, P., Braehler, E., Freyberger, H. J., & Glaesmer, H. (2012). More than 60 years later: the mediating role of trauma and posttraumatic stress disorder for the association of forced displacement in World War II with somatization in old age. *The Journal of nervous and mental disease, 200*(10), 911-914.

Laidlaw, K., & Thompson, L. W. (2008). Cognitive behaviour therapy with depressed older people. *Handbook of emotional disorders in later life: assessment and treatment Oxford: Oxford*.

Laidlaw, K., Thompson, L. W., Gallagher-Thompson, D., & Dick-Siskin, L. (2003). *Cognitive behaviour therapy with older people*: John Wiley & Sons.

Lapp, L. K., Agbokou, C., & Ferreri, F. (2011). PTSD in the elderly: the interaction between trauma and aging. *International Psychogeriatrics, 23*(06), 858-868. doi:10.1017/S1041610211000366

Laufer, R. S., Yager, T., Frey-Wouters, E., & Donnellan, J. (1981). Post-war trauma: Social and Psychological problems of Vietnam veterans in the aftermath of the Vietnam War. *A. Egendorf, C. Kadushin, PS Laufer, G Rothbart, & Sloan (Eds.), Legacies of Vietnam: Comparative adjustment of veterans and their peers. New York: Center for Policy Research*.

Leskela, J., Dieperink, M., & Thuras, P. (2002). Shame and posttraumatic stress disorder. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies, 15*(3), 223-226.

Martin, C. E., Bartlett, B. A., Reddy, M. K., Gonzalez, A., & Vujanovic, A. A. (2018). Associations between Mindfulness Facets and PTSD Symptom Severity in Psychiatric Inpatients. *Mindfulness*, 1-13. https://doi.org/10.1007/s12671-018-0904-5

McLean, J., Maxwell, M., Platt, S., Harris, F. M., & Jepson, R. (2008). *Risk and protective factors for suicide and suicidal behaviour: A literature review*: Scottish Government.

McLeay, S. C., Harvey, W. M., Romaniuk, M. N., Crawford, D. H., Colquhoun, D. M., Young, R. M., . . . Cooksley, G. (2017). Physical comorbidities of post-traumatic stress disorder in Australian Vietnam War veterans. *Med J Aust*, 206(6), 251-257.

McLaughlin, K. A., Koenen, K. C., Friedman, M. J., Ruscio, A. M., Karam, E. G., Shahly, V., ... & Andrade, L. H. (2015). Subthreshold posttraumatic stress disorder in the world health organization world mental health surveys. *Biological psychiatry*, *77*(4), 375-384.

Moher, D., Liberati, A., Tetzlaff, J. A. D., & Altman, D. (2009). PRISMA 2009 flow diagram. *The PRISMA statement, 6*, 1000097.

Mount, M. K., Barrick, M. R., & Stewart, G. L. (1998). Five-factor model of personality and performance in jobs involving interpersonal interactions. *Human performance, 11*(2-3), 145-165. doi:10.1080/08959285.1998.9668029

Moussavi, S., Chatterji, S., Verdes, E., Tandon, A., Patel, V., & Ustun, B. (2007). Depression, chronic diseases, and decrements in health: results from the World Health Surveys. *The Lancet, 370*(9590), 851-858. doi: 10.1016/S0140-6736(07)61415-9

Naylor, J. C., Dolber, T. R., Strauss, J. L., Kilts, J. D., Strauman, T. J., Bradford, D. W., ... & Marx, C. E. (2013). A pilot randomized controlled trial with paroxetine for

subthreshold PTSD in Operation Enduring Freedom/Operation Iraqi Freedom era veterans. *Psychiatry research*, *206*(2-3), 318-320.

NHS Education for Scotland (2017) Transforming Psychological Trauma: A Knowledge And Skills Framework For The Scottish Workforce. *Retrieved from: https://www.nes.scot.nhs.uk/media/3971582/*

Noftle, E. E., & Shaver, P. R. (2006). Attachment dimensions and the big five personality traits: Associations and comparative ability to predict relationship quality. *Journal of Research in Personality, 40*(2), 179-208. doi:10.1016/j.jrp.2004.11.003

Norris, F. H., Friedman, M. J., Watson, P. J., Byrne, C. M., Diaz, E., & Kaniasty, K. (2002). 60,000 Disaster Victims Speak: Part I. An Empirical Review of the Empirical Literature, 1981–2001. *Psychiatry: Interpersonal and Biological Processes*, *65*(3), 207-239. doi:10.1521/psyc.65.3.207.20173

O'Connor, M. (2010). PTSD in older bereaved people. *Aging & mental health*, *14*(6), 670-678.

O'Donnell, C., Cook, J. M., Thompson, R., Riley, K., & Neria, Y. (2006). Verbal and physical aggression in World War II former prisoners of war: Role of posttraumatic stress disorder and depression. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies*, *19*(6), 859-866. doi: https://doi.org/10.1002/jts.20157

Office of National Statistics (2018) Domestic abuse in England and Wales: year ending March 2018. *Retrieved from https://www.ons.gov.uk/*

Ogle, C. M., Rubin, D. C., & Siegler, I. C. (2013). The impact of the developmental timing of trauma exposure on PTSD symptoms and psychosocial functioning among older adults. *Developmental Psychology, 49*(11), 2191-2200. doi:10.1037/a0031985

Ogle, C. M., Rubin, D. C., & Siegler, I. C. (2014). Cumulative exposure to traumatic events in older adults. *Aging & mental health, 18*(3), 316-325. doi:10.1080/13607863.2013.832730

Ogle, C. M., Rubin, D. C., & Siegler, I. C. (2016). Maladaptive trauma appraisals mediate the relation between attachment anxiety and PTSD symptom severity. *Psychological trauma: theory, research, practice, and policy, 8*(3), 301. doi:10.1037/tra0000112

Ouimette, P., Vogt, D., Wade, M., Tirone, V., Greenbaum, M. A., Kimerling, R., . . . Rosen, C. S. (2011). Perceived barriers to care among veterans health administration patients with posttraumatic stress disorder. *Psychological Services, 8*(3), 212.

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: a meta-analysis. *Psychological bulletin, 129*(1), 52. doi: http://dx.doi.org/10.1037/0033-2909.129.1.52

Palic, S., Zerach, G., Shevlin, M., Zeligman, Z., Elklit, A., & Solomon, Z. (2016). Evidence of complex posttraumatic stress disorder (CPTSD) across populations with prolonged trauma of varying interpersonal intensity and ages of exposure. *Psychiatry Research, 246*, 692-699. doi:https://doi.org/10.1016/j.psychres.2016.10.062

Parker, G., Lie, D., Siskind, D. J., Martin-Khan, M., Raphael, B., Crompton, D., & Kisely, S. (2016). Mental health implications for older adults after natural disasters--a systematic review and meta-analysis. *Int Psychogeriatr, 28*(1), 11-20. doi:10.1017/s1041610215001210

Pietrzak, R. H., Goldstein, R. B., Southwick, S. M., & Grant, B. F. (2012a). Physical health conditions associated with posttraumatic stress disorder in U.S. older adults: results from wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of the American Geriatrics Society, 60*(2), 296-303. doi:10.1111/j.1532-5415.2011.03788.x

Pietrzak, R. H., Goldstein, R. B., Southwick, S. M., & Grant, B. F. (2012b). Psychiatric comorbidity of full and partial posttraumatic stress disorder among older adults in the

United States: results from wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions. *The American Journal of Geriatric Psychiatry*, *20*(5), 380-390. doi: https://doi.org/10.1097/JGP.0b013e31820d92e7

Pietrzak, R. H., Johnson, D. C., Goldstein, M. B., Malley, J. C., & Southwick, S. M. (2009). Perceived stigma and barriers to mental health care utilization among OEF-OIF veterans. *Psychiatric services*, *60*(8), 1118-1122. doi:https://doi.org/10.1176/ps.2009.60.8.1118

Qureshi, S. U., Kimbrell, T., Pyne, J. M., Magruder, K. M., Hudson, T. J., Petersen, N. J., . . . Kunik, M. E. (2010). Greater Prevalence and Incidence of Dementia in Older Veterans with Posttraumatic Stress Disorder. *Journal of the American Geriatrics Society*, *58*(9), 1627-1633. doi: https://doi.org/10.1111/j.1532-5415.2010.02977.x

Reynolds, K., Pietrzak, R. H., El-Gabalawy, R., Mackenzie, C. S., & Sareen, J. (2015). Prevalence of psychiatric disorders in U.S. older adults: findings from a nationally representative survey. *World Psychiatry*, *14*(1), 74-81. doi:10.1002/wps.20193

Ron, P. (2011). Intergenerational transmission, attitudes, and post-traumatic stress disorder in times of war: A comparison between elderly people and their adult offspring after the Second Lebanon War (2006) and Casting Lead Operation (2008). *Illness, Crisis & Loss*, *19*(4), 329-349. doi: https://doi.org/10.2190/IL.19.4.c

Rotter, J. (1966) Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs* 80 (1), 1–28

Ruzich, M. J., Looi, J. C. L., & Robertson, M. D. (2005). Delayed onset of posttraumatic stress disorder among male combat veterans: a case series. *The American journal of geriatric psychiatry*, *13*(5), 424-427. doi: https://doi.org/10.1097/00019442-200505000-00013

Schnurr, P. P., Spiro Iii, A., & Paris, A. H. (2000). Physician-diagnosed medical disorders in relation to PTSD symptoms in older male military veterans. *Health Psychology*, *19*(1), 91. doi: http://dx.doi.org/10.1037/0278-6133.19.1.91

Scottish Intercollegiate Guidelines Network. (2012). Methodology Checklist 4: Case-control studies. *Retrieved from http://www.sign.ac.uk/methodology/checklists.html*

Sekiguchi, A., Sugiura, M., Taki, Y., Kotozaki, Y., Nouchi, R., Takeuchi, H., . . . Miyauchi, C. M. (2013). Brain structural changes as vulnerability factors and acquired signs of post-earthquake stress. *Molecular psychiatry, 18*(5), 618. doi: 10.1038/mp.2012.51.

Sharpe, D. (1997). Of apples and oranges, file drawers and garbage: Why validity issues in meta-analysis will not go away. *Clinical psychology review, 17*(8), 881-901. doi: https://doi.org/10.1016/S0272-7358(97)00056-1

Smoller, J. W. (2015). The Genetics of Stress-Related Disorders: PTSD, Depression, and Anxiety Disorders. *Neuropsychopharmacology, 41*, 297. doi:10.1038/npp.2015.266

Southwick, S. M., Vythilingam, M., & Charney, D. S. (2005). The psychobiology of depression and resilience to stress: implications for prevention and treatment. *Annu Rev Clin Psychol, 1*, 255-291. doi:10.1146/annurev.clinpsy.1.102803.143948

Spitzer, C., Barnow, S., Völzke, H., John, U., Freyberger, H. J., & Grabe, H. J. (2008). Trauma and posttraumatic stress disorder in the elderly: findings from a German community study. *The Journal of clinical psychiatry*. doi: http://dx.doi.org/10.4088/JCP.v69n0501

Stadtmann, M. P., Maercker, A., Binder, J., & Schnepp, W. (2018a). Mastering life together-symptom management, views, and experiences of relatives of persons with CPTSD: a grounded theory study. *Journal of patient-reported outcomes, 2*(1), 50. doi: https://doi.org/10.1186/s41687-018-0070-5

Stadtmann, M. P., Maercker, A., Binder, J., & Schnepp, W. (2018b). Why do I have to suffer? Symptom management, views and experiences of persons with a CPTSD: a grounded theory approach. *BMC psychiatry, 18*(1), 392. doi:https://doi.org/10.1186/s12888-018-1971-9

Sedgwick, P. (2014). Cross sectional studies: advantages and disadvantages. *British Medical Journal*, 348, g2276.

Stoltenborgh, M., Bakermans- Kranenburg, M. J., Alink, L. R. A., & van Ijzendoorn, M. H. (2015). The prevalence of child maltreatment across the globe: Review of a series of meta- analyses. *Child Abuse Review, 24*(1), 37-50. doi:https://doi.org/10.1002/car.2353

Sullivan, T. P., Fehon, D. C., Andres- Hyman, R. C., Lipschitz, D. S., & Grilo, C. M. (2006). Differential relationships of childhood abuse and neglect subtypes to PTSD symptom clusters among adolescent inpatients. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies, 19*(2), 229-239. doi: https://doi.org/10.1002/jts.20092

Tapia, G. (2018). The mediating role of early maladaptive schemas on relations between post-traumatic stress disorder symptom severity and illicit substance use disorder AU - Lecigne, Marion. *Journal of Substance Use, 23*(6), 634-639. doi:10.1080/14659891.2018.1489005

Theeke, L. A. (2009). Predictors of loneliness in US adults over age sixty-five. *Archives of psychiatric nursing, 23*(5), 387-396. doi:10.1016/j.apnu.2008.11.002

Trickey, D., Siddaway, A. P., Meiser-Stedman, R., Serpell, L., & Field, A. P. (2012). A meta-analysis of risk factors for post-traumatic stress disorder in children and adolescents. *Clinical psychology review, 32*(2), 122-138. doi:10.1016/j.cpr.2011.12.001

Udwin, O., Boyle, S., Yule, W., Bolton, D., & O'Ryan, D. (2000). Risk Factors for Long-term Psychological Effects of a Disaster Experienced in Adolescence: Predictors of Post Traumatic Stress Disorder. *The Journal of Child Psychology and Psychiatry and Allied Disciplines, 41*(8), 969-979.

Van Zelst, W. H., de Beurs, E., Beekman, A. T. F., Deeg, D. J. H., & van Dyck, R. (2003). Prevalence and risk factors of posttraumatic stress disorder in older adults. *Psychotherapy and Psychosomatics, 72*(6), 333-342. doi:10.1159/000073030

van Zelst, W. H., de Beurs, E., Beekman, A. T. F., van Dyck, R., & Deeg, D. D. H. (2006). Well- being, physical functioning, and use of health services in the elderly with PTSD and sub-threshold PTSD. *International Journal of Geriatric Psychiatry*, *21*(2), 180-188. doi: https://doi.org/10.1002/gps.1448

von Collani, G. (2002). A new occupational self-efficacy scale and its relation to personality constructs and organizational variables AU - Schyns, Birgit. *European Journal of Work and Organizational Psychology*, *11*(2), 219-241. doi:10.1080/13594320244000148

Von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., Vandenbroucke, J. P., & Strobe, I. (2014). Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies. *International Journal of Surgery, 12*(12), 1495-1499. doi:10.1016/j.ijsu.2014.07.014

Wade, D., Hardy, R., Howell, D., & Mythen, M. (2013). Identifying clinical and acute psychological risk factors for PTSD after critical care: a systematic review. *Minerva Anestesiol*, *79*(8), 944-963.

Walter, K. H., Glassman, L. H., Michael Hunt, W., Otis, N. P., & Thomsen, C. J. (2018). Evaluation of an integrated treatment for active duty service members with comorbid posttraumatic stress disorder and major depressive disorder: Study protocol for a randomized controlled trial. *Contemporary Clinical Trials*, 64, 152-160. doi:https://doi.org/10.1016/j.cct.2017.10.010

Widiger, T. A., & Oltmanns, J. R. (2017). Neuroticism is a fundamental domain of personality with enormous public health implications. *World Psychiatry*, *16*(2), 144.

Wittekind, C. E., Muhtz, C., Jelinek, L., & Moritz, S. (2015). Depression, not PTSD, is associated with attentional biases for emotional visual cues in early traumatized individuals with PTSD. *Frontiers in psychology*, *5*, 1474.

Wittekind, C. E., Muhtz, C., Moritz, S., & Jelinek, L. (2017). Performance in a blocked versus randomized emotional Stroop task in an aged, early traumatized group with

and without posttraumatic stress symptoms. *Journal of behavior therapy and experimental psychiatry, 54*, 35-43.

World Health Organisation (2018) International Classification of Diseases 11th Revision. *Retrieved from https://icd.who.int/ct11_2018/icd11_mms/en/release#/*

Wright, M. O. D., Crawford, E., & Del Castillo, D. (2009). Childhood emotional maltreatment and later psychological distress among college students: The mediating role of maladaptive schemas. *Child Abuse & Neglect, 33*(1), 59-68. doi:http://dx.doi.org/10.1016/j.chiabu.2008.12.007

Yehuda, R., & Flory, J. D. (2007). Differentiating biological correlates of risk, PTSD, and resilience following trauma exposure. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies*, *20*(4), 435-447. doi:10.1002/jts.20260

Yehuda, R., Flory, J. D., Southwick, S., & Charney, D. S. (2006). Developing an Agenda for Translational Studies of Resilience and Vulnerability Following Trauma Exposure. *Annals of the New York Academy of Sciences, 1071*(1), 379-396. doi:10.1196/annals.1364.028

Yehuda, R., Golier, J. A., Halligan, S. L., & Harvey, P. D. (2004). Learning and memory in Holocaust survivors with posttraumatic stress disorder. *Biological Psychiatry*, *55*(3), 291-295. doi:10.1016/S0006-3223(03)00641-3

Yehuda, R., Kahana, B., Southwick, S. M., & Giller, E. L. (1994). Depressive features in holocaust survivors with post-traumatic stress disorder. *Journal of Traumatic Stress, 7*(4), 699-704. doi:10.1007/BF02103016

Yehuda, R. (2009). Status of glucocorticoid alterations in post- traumatic stress disorder. *Annals of the New York Academy of Sciences*, 1179(1), 56-69.

Young, J. E., Klosko, J. S., & Weishaar, M. E. (2003). *Schema therapy: A practitioner's guide*: Guilford Press.

Zhang, Z., Shi, Z., Wang, L., & Liu, M. (2012). Post- traumatic Stress Disorder, Anxiety and Depression among the Elderly: A Survey of the Hard- hit Areas a Year after the Wenchuan Earthquake. *Stress and Health, 28*(1), 61-68. doi:10.1002/smi.1403

Chapter 2: Original Research Journal Article

Title: The mediating role of early maladaptive schemas in the relationship between childhood traumatic events and complex posttraumatic stress disorder symptoms in older adults (>64 years)

Eleni Vasilopoulou*, Trainee Clinical Psychologist, University of Edinburgh
Prof Thanos Karatzias, Professor of Mental Health at Edinburgh Napier University/ Consultant Clinical Psychologist, Rivers Centre for Traumatic Stress.
Dr Hannah Wallace, Clinical Psychologist, NHS Lothian
Dr Philip Hyland, Senior Lecturer in Psychology, Maynooth University, Kildare, Ireland
Dr Azucena Guzman, Lecturer in Health and Aging, University of Edinburgh/ Clinical Psychologist, Department of Clinical Neuroscience, Western General Hospital

Abstract

Objectives: Complex PTSD (CPTSD) has recently been included in ICD-11 and can result from prolonged exposure to interpersonal trauma, particularly in childhood. Early Maladaptive Schemas (EMS) have been strongly linked to the development and maintenance of PTSD symptoms. However, the relationship between EMS and CPTSD is unknown, especially in later life. Investigation of the psychological factors that may be associated with CPTSD symptoms, such as EMS, is an important first step in developing effective treatments for this new condition. The purpose of the current study was to investigate the mediating role of EMS in the association between childhood trauma and CPTSD symptom severity in a clinical sample of older adults (>64 years).

Methods: A cross-sectional study was undertaken with 42 individuals, currently seen for psychological treatment within NHS Scotland Older Adult Services. Participants completed measures of Childhood trauma, EMS and ICD-11 CPTSD. A mediation analysis was conducted to examine whether EMS mediated the relationship between experiences of childhood trauma and CPTSD symptom severity.

Results: It was found that EMS total score mediated the relationship between childhood trauma and CPTSD symptom severity. Two second order schema factors (Disconnection; Impaired Autonomy) also played a mediatory role in this relationship.

Conclusions: Results provide preliminary support for the utility of interventions targeting EMS, particularly in the domains of Disconnection and Impaired Autonomy, in order to alleviate CPTSD symptoms. Future research is required to replicate these results within larger samples and to examine the efficacy of schema and cognitive interventions within trauma exposed older adults.

Keywords: Childhood trauma; schemas; CPTSD; older adults

*Correspondence to: Eleni Vasilopoulou, School of Health in Social Science, The University of Edinburgh Medical School, Teviot Place, EH8 9AG. Email: eleni.vasilopoulou@nhslothian.scot.nhs.uk

Funding details: This work was prepared in part fulfilment of the degree of Doctorate in Clinical Psychology, funded by NHS Education for Scotland.

Disclosure statement: The authors declare no conflict of interest.

Practitioner Points**:**

- EMS total score significantly mediated the relationship between childhood trauma and CPTSD symptom severity.
- In separate analyses, the relationship between childhood trauma and CPTSD symptom severity was mediated by the EMS domains Impaired Autonomy and Disconnection.
- Targeting EMS seems a promising avenue for the treatment of CPTSD symptoms in older people.

Cautions or limitations:

- This study utilised a Cross-sectional design and therefore cannot make assertions about causality in the observed relationships.
- Another study limitation included a relatively small sample size, which may prohibit the generalisation of our findings.

Acknowledgements: The authors would like to thank Mr Sandy McAfee, former Consultant Clinical Psychologist in NHS Lothian for his support in the initial stages of the research.

1. Introduction

Complex Posttraumatic Stress Disorder (CPTSD) has recently been included in the 11th Revision of the International Classification of Diseases (ICD-11) as a sibling condition to Posttraumatic Stress Disorder (PTSD) (World Health Organisation, 2018). In contrast to PTSD which can be triggered by a single event, CPTSD is viewed as a result of exposure to cumulative trauma, particularly in childhood (Cloitre, Garvert, Brewin, Bryant, & Maercker, 2013; Elklit, Hyland, & Shevlin, 2014; Hyland et al., 2017; Karatzias et al., 2017). CPTSD symptoms reflect self-organisation disturbances (affective dysregulation, negative self-concept and disturbances in relationships) in addition to the three PTSD symptom clusters (re-experiencing, avoidance/numbing, and hyperarousal/hypervigilance).

Lifetime population prevalence of CPTSD is estimated around 3.3.% (Karatzias et al., 2018). Although this rate is lower than that typically reported for PTSD (4%), CPTSD constitutes a more common disorder among clinical samples (Karatzias et al., 2018). In addition, due to the greater diversity of symptoms, CPTSD can have a more pervasive impact on individuals' lives and has been associated with more severe functional impairment compared to PTSD (Karatzias et al., 2017; Hyland et al., 2017). The high clinical occurrence and debilitating impact of CPTSD emphasise the need for early identification of the disorder and for the development of targeted treatments in order to improve service users' prognosis and functioning.

In recent years, there has been a rise in publications on the presentation and correlates of posttraumatic symptoms among older adults. The need for this is highlighted by an increasing aging population (Dall et al., 2013), as well as by research arguing for the unique features of PTSD in later life, particularly in regard to symptom profiles (Goenjian et al., 1994), onset (Hiskey, Luckie, Davies, & Brewin, 2008) and severity (Parker et al., 2016). However, despite the recent rise in interest, the majority of older adult studies have focused on either middle or later life traumatisation, particularly combat exposure, natural disasters and physical illness [BLINDED]. Meanwhile, there is a dearth of research on the impact of exposure to childhood trauma and, to our knowledge, no studies have examined the factors affecting CPTSD symptom severity as per ICD 11 in later life. This constitutes a significant limitation as prevalence rates suggest that more than one third of adults have experienced

trauma in childhood (Stoltenborgh, Bakermans- Kranenburg, Alink, & van Ijzendoorn, 2015). A better understanding of the factors associated with CPTSD symptoms following early life traumatisation is paramount to adequately address the support needs of this population.

Research in younger adults has demonstrated the role of Early Maladaptive Schemas (EMS) in predicting the emergence and severity of PTSD following traumatisation (Ahmadian, Mirzaee, Omidbeygi, Holsboer-Trachsler, & Brand, 2015; Price, 2007; Tapia, 2018). EMS are defined as themes regarding oneself and one's relationship with others, which develop during childhood, can have a long-lasting impact and interfere with how people view themselves and their interaction with others (Young, Klosko, & Weishaar, 2003). Eighteen EMS have been proposed and are subsequently categorised in four secondary schema factors: Disconnection; Impaired Autonomy; Exaggerated Standards and Impaired Limits (Hoffart, et al., 2005). Schemas within the first two domains have been more strongly associated with PTSD (Harding, Burns, & Jackson, 2012; Karatzias, Jowett, Begley, & Deas, 2016; Price, 2007). Although the relationship between EMS and PTSD has been researched in the adult population (Karatzias, et al., 2016), no studies have investigated the role of EMS in the development of CPTSD symptoms in older adults (>64).

The current study aimed to address this gap by examining whether EMS mediate the relationship between early traumatic events and CPTSD symptoms in a clinical sample of older adults. The study also sought to investigate the mediating role of the second order schema factors in this association. First, it was hypothesized that the degree of childhood trauma would exert its influence on CPTSD severity through EMS. In addition, based on previous research (Harding et al., 2012; Karatzias et al., 2016; Price, 2007) it was hypothesized that the second order schema factors of Disconnection and Impaired Autonomy would have a mediatory role in this association.

A better understanding of the factors associated with the severity of CPTSD symptoms within older adults is important when considering the assessment and early identification of traumatised individuals. Such an understanding could increase our knowledge of how to support and respond to older people who have experienced trauma. In particular, if a positive mediating relationship is established, this study could offer preliminary results on the

usefulness of cognitive or schema based interventions with older people. Furthermore, by specifying which schema domains need to be targeted in order to alleviate distress in older people with CPTSD symptoms, this study could guide the focus of future complex trauma interventions within this population. This is paramount in the development of accessible services appropriate to the needs of older people and is in line with UK policies aiming to reduce health inequalities and promote wellbeing across the lifespan (The Scottish Government, 2017).

2. Method

2.1. Participants and Procedure

Participants in this study were individuals who were seen for psychological therapy by psychologists, psychiatrists or community mental health clinicians within the National Health Service (NHS) Older Adult services. Older adults (>64) with a history of childhood trauma (physical abuse, sexual abuse, emotional abuse, physical neglect, emotional neglect) were eligible for participation. In order to participate in the study, service users required to be willing to participate voluntarily and to be able to give written informed consent. Older adults with a diagnosis of Mild Cognitive Impairment or Dementia were excluded from the study. Older adults who lacked fluency in English were also excluded. For ethical reasons and to ensure individuals' safety, this study excluded older adults in crisis, experiencing suicidal thoughts with clear intent to harm themselves as well as individuals who lacked capacity to consent to research.

The researcher contacted Older People's Community Mental Health Teams in Scotland explaining the purpose of the study, study rationale and recruitment process. NHS staff were asked to identify potential participants from their caseloads who met inclusion and exclusion criteria. Clinicians were given information sheets to disseminate to identified service users outlining research aims, overview and procedure. Clinicians were asked to request service users' verbal consent for the researcher to contact them in order to provide them with more information about the study. Following a period of at least 24 hours, the first author telephoned potential participants who gave their permission to be contacted. If individuals

were still interested in taking part, a meeting was arranged to obtain informed consent and to complete study measures. This study received ethical approval from the North of Scotland Research Ethics Service (Reference: 17/NS/0117).

2.2. Measures

2.2.1. Childhood Trauma Questionnaire (Bernstein & Fink, 1998): Exposure to childhood traumatic events was measured by the Childhood Trauma Questionnaire. The CTQ is a 28-item retrospective self-report questionnaire which includes five subscales: Emotional Abuse, Physical Abuse, Sexual Abuse, Emotional Neglect, and Physical Neglect. Example items include "There was always someone to take me to the doctor when I needed it" or "I believe I was emotionally abused". In addition, the questionnaire includes a Minimization/Denial scale in order to identify the underreporting of traumatic events and to assess recall and reporting biases. Participants are asked to respond to each question on a 5-point scale ranging from "never true" (1) to "very often true" (5). The CTQ has demonstrated strong psychometric properties when used both in clinical and community settings (Bernstein, Ahluvalia, Pogge, & Handelsman, 1997; Scher, Stein, Asmundson, McCreary, & Forde, 2001), as well as when used with older adults (Inammorati et al., 2016).

2.2.2. Young Schema Questionnaire – Short Form, 3rd Edition (Young, 2014): The Young Schema Questionnaire – Short Form, 3rd Edition (YSQ-S3) was used to measure EMS. The YSQ-S3 is a self-report measure assessing 18 EMS. The items are categorized in four schema factors which replaced Young's previous five schema domains (Young, 2003): Disconnection, Impaired Autonomy, Exaggerated Standards, and Impaired Limits (Hoffart, et al., 2005). Participants are asked to rate descriptive statements on a 6-step Likert-scale which ranges from "completely untrue of me" to "describes me perfectly". The YSQ-S3 provides a total score and higher values are associated with a stronger presence of EMS. This measure has demonstrated good psychometric properties and has shown age neutrality when administered across the lifespan (Oei & Baranoff, 2007; Pauwels et al., 2014). Example items include "I find myself clinging to people I'm close to because I'm afraid they'll leave me", and "I think that if I do what I want, I'm only asking for trouble".

2.2.3. International Trauma Questionnaire (ITQ) (Cloitre et al., 2018): The ITQ is a 12-item self-report measure of PTSD and CPTSD severity, which assesses the following symptom areas: re-experiencing, avoidance, sense of threat, affective dysregulation, negative self-concept and disturbances in relationships. Participants are asked to select on a Likert scale how much a symptom has been bothersome in the past month, with scores ranging from 0 (not at all) to 4 (extremely). Example items include "having upsetting dreams that replay part of the experience or are clearly related to the experience", "avoiding internal reminders of the experience (for example, thoughts, feelings, or physical sensations)" and "Being super-alert, watchful, or on guard". Participants are also asked to rate how true certain statements are of them. These include "When I am upset, it takes me a long time to calm down" or "I feel like a failure". Diagnosis of PTSD requires the endorsement of one of two symptoms from each PTSD cluster (re-experiencing, avoidance, sense of threat), while CPTSD diagnosis requires the endorsement of one of two symptoms from both PTSD and DSO clusters (affective dysregulation, negative self-concept, and disturbances in relationships). Endorsement is indicated by a score of 2 (moderately) or higher. Both diagnoses require the presence of functional impairment associated with these symptoms. The ICD-11 taxonomic structure allows either for a diagnosis of PTSD or CPTSD to be given to an individual, but not both. ITQ is the only validated measure for ICD-11 PTSD and CPTSD, and its validity has been confirmed with adult and older adult samples (Hyland et al., 2017b).

3. Analysis

Descriptive analyses were performed using the Statistical Package for Social Science (SPSS version 23.0). Means and standard deviations (SDs) were calculated for continuous variables and frequencies (%) for categorical variables. Mediation analysis (Hayes, 2013) was implemented to answer the primary research question. Hayes PROCESS macro Model 4 (Hayes, 2013) for SPSS was be used to analyse the data. As suggested by Hayes (2013) direct and indirect effects were calculated together with the constituent components of the indirect effect (i.e. the effect of early traumatic events on EMS and the effect of EMS on CPTSD symptoms).

Bootstrapped sampling distribution was used to estimate the indirect effect, the standard error and 95% confidence intervals for the population value of 'ab' (Preacher & Hayes, 2004). Bootstrapping does not assume normality in the distributions of the variables or the sampling distribution of the statistic and can therefore be applied to small samples with more confidence (Preacher & Hayes, 2004).

The CTQ minimising response bias was entered in the analysis as a covariate, as research has suggested a significant effect of this subscale in the CTQ's discriminative validity (MacDonald, Thomas, MacDonald, & Sciolla, 2014; MacDonald et al., 2016). In fact, researchers have warned against using the CTQ without assessing and controlling for its effects on outcomes or dependent variables (MacDonald et al., 2016).

Sample size calculations were based upon the primary research question. Fritz & MacKinnon (2007) have published guidelines in regard to obtaining an adequate sample size for mediation analysis. The authors proposed a minimum number of participants to achieve 0.8 power depending on the magnitude of the estimated effect sizes for the 'a' and 'b' mediation pathways. Previous research (Foa, Ehlers, Clark, Tolin, & Orsillo, 1999; Karatzias et al., 2016; Wright, Crawford, & Del Castillo, 2009) has indicated large effect sizes for the 'a' and 'b' pathways. Based on these findings, a sample size of 34 was deemed appropriate.

4. Results

4.1 Descriptive statistics

A total of 59 eligible patients were identified by clinicians and were given information about the study during the recruitment period. Of those, 42 agreed to participate (71%). The main reason for non-participation was service users' fear of becoming distressed by discussing their traumatic experiences. Participant demographic and population characteristics are summarised in table 1.

CTQ trauma scores ranged from 30 to 108, with a mean of 62.2 (15.8). Trauma exposure frequencies by type of trauma can be seen in table 2. The majority of participants (N=38, 90.5%) reported having experienced some degree of emotional abuse. The most frequently

reported severe traumatic experience was emotional neglect with 57.1% of participants scoring in the 'severe to extreme' range of the CTQ scale. This was followed by emotional abuse (40.5%), physical abuse (33.3%), sexual abuse (26.2%) and physical neglect (21.4%). Participants reported CPTSD severity scores ranging from 4 to 44 (Mean=23.8, SD=11.7) (Table 3). Thirteen participants (30.9%) met criteria for a diagnosis of CPTSD, while three participants (7.1%) met criteria for PTSD. The most frequently endorsed PTSD symptom was from the re-experiencing of threat symptom cluster, with 76.2% of participants noting having had images or memories in which they felt that the experience is happening again in the here and now. The most commonly reported CPTSD symptom was in the affective dysregulation domain: The majority of participants (90.5%) endorsed the item 'When I am upset, it takes me a long time to calm down'. Means and standard deviations of CPTSD symptom clusters can be seen in Table 3.

4.2 Correlations

Correlations between childhood traumatic experiences, complex trauma symptoms, proposed mediators and relevant demographic variables are shown in table 4.

Table 1: Participant Characteristics

Variable	M (SD) or n (%) n=42
Age mean (SD)	71.5 (4.6)
Gender %	
Male	11 (26.2%)
Female	31 (73.8%)
Education mean (SD)	13 (3.6)
Relationship status	
Single	9 (21.4%)
Married	17 (40.5%)
Divorced	10 (23.8%)
Widowed	6 (14.3%)
Employment status	
Employed	4 (9.5%)
Retired	38 (90.5%)
Ethnicity	
White British	22 (52.4%)
White Scottish	19 (45.2%)
White Other	1 (2.4%)
Income	
Less than 14,999	17 (40.5%)
15,000 to 19,999	8 (19.0%)
20,000 to 29,000	10 (23.8%)
30,000 to 39,000	3 (7.1%)
50,000 to 59,000	2 (4.8%)
60,000 to 69,000	2 (4.8%)
Medical conditions	
Depression	13 (30.9%)
Arthritis	11 (26.1%)
COPD	10 (23.8%)
Cancer	6 (14.2%)

Table 2: Trauma Characteristics

Trauma frequencies		N (%)
Emotional abuse	Yes	38 (90.5)
	No	4 (9.5)
Physical abuse	Yes	26 (61.9)
	No	16 (38.1)
Sexual abuse	Yes	24 (57.1)
	No	18 (42.9)
Emotional neglect	Yes	37 (78.1)
	No	5 (11.9)
Physical neglect	Yes	25 (59.5)
	No	17 (40.5)
Minimisation/Denial	0	32 (76.2)
	1	9 (21.4)
	3	1 (2.4)

Table 3: CPTSD Symptom Clusters

CPTSD symptoms	Range	Mean (SD)
Re-experiencing	0-7	2.67 (2.40)
Avoidance	0-8	3.81 (2.80)
Sense of threat	0-8	4.62 (2.37)
Affective Dysregulation	1-8	4.74 (2.10)
Negative Self-Concept	0-8	3.79 (3.19)
Disturbances in Relationships	0-8	4.21 (2.67)
PTSD	1-23	11.10 (6.00)
DSO	2-24	12.74 (6.98)
CPTSD Total score	4.-44	23.83 (11.78)

Table 4. Bivariate Correlations between Demographic Characteristics and Study Variables.

Variable	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	-.071	-.212	-.218	-.244	-.098	.193	-.250	.072	.148	-.031	.034	.025	.069	-.111
2. Gender	1	.177	.040	.271	.124	.285	.033	.243	.031	.215	.125	.247	.292	.105
3.YSQ TS		1	**.855****	**.940****	**.702****	**.627****	**.784****	**.247**	**.190**	**.336***	-.001	.251	**.352***	.212
4.Disconnection			1	**.752****	**.407****	**.388***	**.785****	.246	.175	**.314***	.014	.282	**.350***	.166
5. Impaired Autonomy				1	**.578****	**.565****	**.746****	.238	.111	**.354***	-.042	.171	.300	.233
6.Exaggerated Standards					1	**.567****	**.471****	-.021	.192	.298	-.074	.246	.226	.224
7.Impaired Limits						1	.294	.185	.135	.248	.010	.120	.247	.065
8. CPTSD							1	.071	.164	**.392***	-.200	.116	.211	**.358***
9. EA								1	.242	-.084	**.558****	.232	**.594****	-.282
10. PA									1	**.346***	.244	**.407****	**.725****	**-.341***
11. SA										1	-.304	**.370***	**.534****	.053
12. EN											1	.153	**.503****	**-.568****
13. PN												1	**.670****	-.221
14. CTQ TS													1	**-.426****
15. MD														1

CPTSD: Complex Posttraumatic Stress Disorder Severity; EA: Emotional Abuse; EN: Emotional Neglect; PA: Physical Abuse; PN: Physical Neglect; SA: Sexual Abuse; CTQ TS: Childhood Trauma Questionnaire Total Score. YSQ TS: Young Schema Questionnaire Short Form Total Score; *p<.05, **p<.001.

4.3 Mediation Analyses

First, simple mediation analysis was conducted to examine any mediating effects of EMS on the relationship between childhood trauma and CPTSD severity (Figure 1). Results indicated that after controlling for minimisation/denial of childhood trauma, EMS total score significantly mediated the relationship between experiences of childhood trauma and CPTSD severity (β=.39; BootSE=.15, BootLLCI=.08, BootULCI=0.67). Childhood trauma significantly predicted EMS total score (B=.6, p=.001), which in turn significantly predicted CPTSD symptom severity (B=.5, p=.001). The mediation model accounted for 65% of the amount of variance in CPTSD severity (R^2 = .65; F(3,38)=24.02; p=.000). In order to estimate the magnitude of the indirect effect, the k^2 co-efficient was calculated based on Preacher and Kelly's (2011) guidelines, suggesting a large effect size (k^2= 0.48).

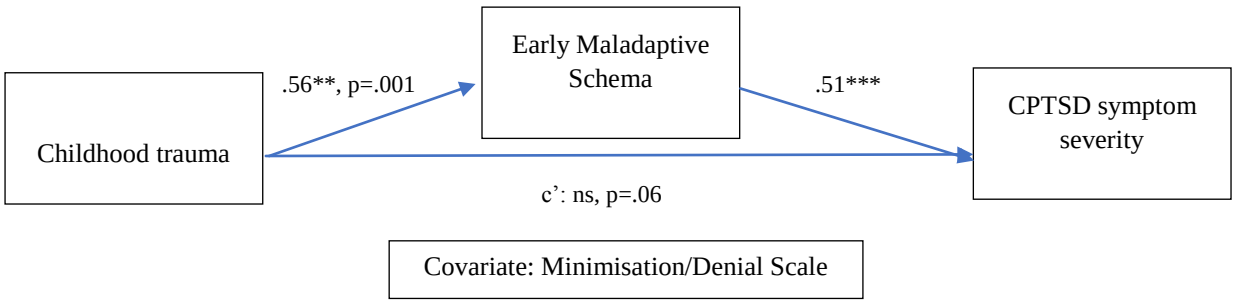


Figure 1: First mediation model and associated p-values (* p < 0.05, ** p < 0.01, *** p<0.001) of the pathway between childhood trauma, EMS and CPTSD symptom severity. Covariates: Minimisation/Denial scale. c' = direct effects of independent variable on dependent variable.

Three additional, exploratory mediation analyses were conducted to examine whether specific second order schemas (Disconnection; Impaired Autonomy; Exaggerated standards) mediated the relationship between childhood trauma and CPTSD severity. Impaired Limits was not entered into the analysis due to the absence of an association in our Bivariate analysis. Of the three second order schema domains, only the first two mediated this relationship and are presented below (Figures 2 and 3). The indirect effect for the remaining mediation model (Exaggerated Standards) was not significant (Supplementary figure 1).

The second mediation model explored the pathway from childhood trauma to CPTSD severity through Disconnection (Figure 2). This model explained 67% of the variance in CPTSD scores (F(3,38)=26.16, p=.000) with a significant indirect effect (β=.37, BootSE=.14, BootLLCI=.09; Boot ULCI=.63). Similarly, to the first mediation model, k^2 (Preacher & Kelley, 2011) indicated a large effect size ($k^{2=}$0.46).

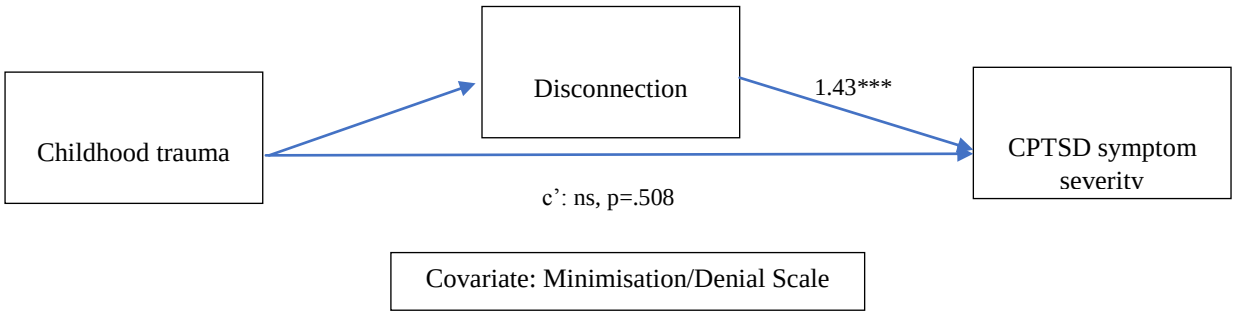


Figure 2: Second mediation model and associated p-values (* p < 0.05, ** p < 0.01, ***p<0.001) of the pathway between childhood trauma, Disconnection and CPTSD symptom severity. Covariates: Minimisation/Denial scale. c' = direct effects of independent variable on dependent variable.

To test the effect of Impaired Autonomy as a mediator in the relationship between childhood trauma and CPTSD symptom severity, a third simple mediation analysis was conducted. Findings indicated significant relationships for both a and b pathways, as well as for the indirect effect ab (β=.32, BootSE=.11, BootLLCI=.07, BootULCI=.52). This model accounted for 60% of the variance in CPTSD scores. k^2 indicated the presence of a large mediating effect (k^2= 0.38).

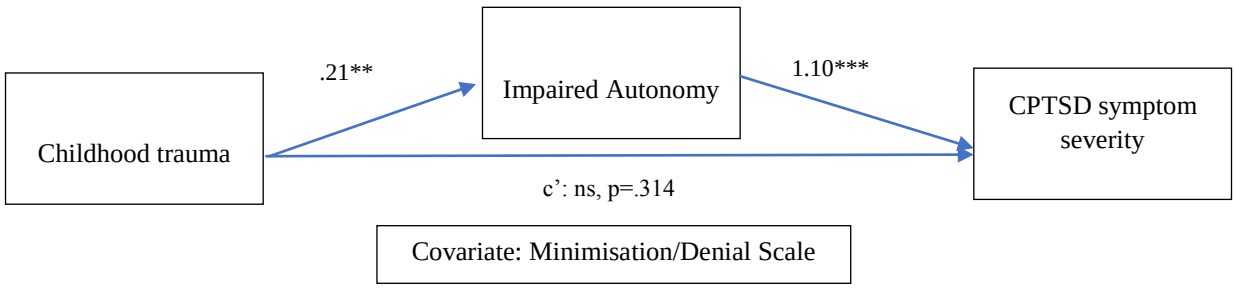


Figure 3: Mediation model and associated p-values (* p < 0.05, ** p < 0.01, *** p<0.001) of the pathway between childhood trauma, Impaired Autonomy and CPTSD symptom severity. Covariates: Minimisation/Denial scale. c' = direct effects of independent variable on dependent variable.

5. Discussion

The aim of the current study was to examine the relationship between childhood trauma, Early Maladaptive Schemas (EMS) and CPTSD severity within an older adult clinical sample. In line with our hypotheses, our study found that EMS mediated the relationship between childhood trauma and CPTSD. This effect persisted when we separately examined the mediatory role of the second order schema domains of Disconnection and Impaired Autonomy.

Our results provide preliminary support for the Schema Therapy model (Young, 2003), specifically in regard to its principle that EMS develop in response to adverse childhood experiences. In our study, participants who reported greater degree of traumatisation in childhood were more likely to display elevated levels of EMS. This is not surprising given that early experiences shape expectations regarding the degree of support from one's environment, and can elicit beliefs around the reliability, predictability or emotional availability of others (Pynoos, Steinberg, & Wraith, 1995). Adverse childhood experiences such as physical abuse, physical neglect and sexual abuse, can disrupt this process and have been shown to have a potentially detrimental impact on how individuals conceptualise themselves and others around them (Estévez, Jauregui, Ozerinjauregi, & Herrero-Fernández, 2017; Roemmele & Messman-Moore, 2011). Consistent with previous research (Rezaei, Ghazanfari, & rezaee, 2016), our study linked trauma experiences to schemas specifically within the Disconnection and Impaired Autonomy domains. Disconnection schemas include beliefs around others being emotionally unresponsive, hurtful, or manipulative. Participants with elevated Disconnection schemas may see themselves as inadequate, defective and socially isolated. Impaired Autonomy includes schemas relating to abandonment, dependence and vulnerability to harm. People with Impaired Autonomy schemas may have difficulties achieving their goals, separating from others and are more likely to relate to others in a subjugative manner. Such relational patterns are not uncommon among trauma survivors, and can be adaptive, depending on the context (Creech, Benzer, Liebsack, Proctor, & Taft, 2013). For example, avoidance oriented schemas (e.g. social isolation, subjugation) may be protective in the short term, as they can allow trauma survivors to prevent re-traumatisation and cope with an unpredictable or stressful environment (Thomson & Jaque, 2019).

Perhaps, it may feel counterintuitive that the link between EMS and child adversity remained as strong in later life, as that reported in adult or child research (Lumley & Harkness, 2007; Wright, Crawford, & Del Castillo, 2009), especially when taking into account gerontological findings on the successful processing of past experiences among older adults (Neupert, Almeida, & Charles, 2007). A possible explanation for this finding lies in the pervasiveness of EMS: EMS are thought to significantly interfere with the completion of a range of developmental tasks, which may lead to a continuation of negative experiences across the lifespan (Gay, Harding, Jackson, Burns, & Baker, 2013). Such experiences can provide little opportunity to challenge established maladaptive cognitions and can therefore enhance schema rigidity (Atmaca & Gençöz, 2016; Gay et al., 2013; van Genderen et al., 2012). In that sense it is not surprising that, within our sample, EMS were associated with early adverse experiences despite the passage of time.

Furthermore, results from our study supported the relationship between EMS and CPTSD symptoms, by showing that higher levels of EMS (total score) were associated with increased CPTSD severity. Exploratory analyses also demonstrated that the association between childhood trauma and CPTSD severity was mediated by schemas within the Impaired Autonomy and Disconnection domains. These findings are consistent with cognitive models of PTSD, which highlight the role of cognitions in the development and maintenance of posttraumatic symptoms (Ehlers & Clark, 2000; Foa et al., 1999). Our results are also in line with existing research and guidelines on the treatment of CPTSD, which emphasise the importance of challenging unhelpful appraisals in order to promote a positive sense of self and healthier relationships with others (Cloitre et al., 2011; Maercker, Brewin, Bryant, Cloitre, Reed, et al., 2013). Finally, our results are consistent with previous research on the specific contribution of Disconnection and Impaired Autonomy domains to psychopathology following interpersonal trauma (Karatzias et al., 2016).

These findings add to existing research on the link between EMS and psychopathology by showing that EMS constitute a potent vulnerability factor for complex posttraumatic symptoms. These results hold significant implications for the identification of trauma exposed individuals in need of support as well for CPTSD prevention and treatment.

Considering these outcomes, the inclusion of routine EMS assessment in clinical practice, may be particularly helpful in order to identify trauma exposed service users at risk of developing CPTSD. Similarly, a preventative approach which includes the promotion of positive reappraisal following childhood traumatisation, may be beneficial in safeguarding individuals across the lifespan against the development of posttraumatic symptoms. More importantly, our results provide preliminary, empirical support for the utility of cognitive-behavioural interventions among traumatised older adults. Specifically, our findings suggest that Schema therapy, with a particular focus on EMS within the Disconnection and Impaired Autonomy domains, may be a useful treatment in order to modify existing core beliefs and reduce CPTSD symptoms within this population. These results can inform the very limited research on the efficacy of Schema therapy in later life (Kindynis, Burlacu, Louville, & Limosin, 2013; Videler, Rossi, Schoevaars, Van der Feltz-Cornelis, & Van Alphen, 2014).

5.1 Strengths and Limitations

A number of limitations need to be considered when interpreting the above research findings. First, our study utilised a Cross-sectional design, therefore we cannot make assertions about causality in the observed relationships. Prospective, longitudinal studies are required to examine the specific roles that childhood trauma and EMS may play in the development and maintenance of CPTSD symptoms. Second, our study included a relatively small sample size, which increases the risk for Type I and Type II errors and, as such, may prohibit the replicability and generalisation of the above findings. A further limitation has to do with an inherent methodological issue in trauma research: As avoidance is a core symptom of posttraumatic symptomatology, this study may have precluded older people suffering from more severe CPTSD from participating, thereby leading to a biased sample. In addition, the majority of our sample comprised of female participants which may further limit the generalisability of findings to the wider trauma population. 'Oldest old' (aged 80+) participants were also underrepresented in our sample. Finally, due to sample size limitations our study did not explore potentially confounding variables, such as adult traumatic exposure, health difficulties and coping mechanisms within our sample.

Notwithstanding these limitations, this is the first study to examine the relationship between EMS and CPTSD within an older adult, clinical sample and provides novel evidence for the

role of EMS in CPTSD symptom severity. This study can further our understanding of maladaptive and enduring cognitive schemas in older adults with childhood traumatic experiences and attempts to address a significant gap in research (Videler, van Royen & van Alphen, 2012). Further strengths of this study include the robustness and completeness of collected information as the first author supported participants in filling out the study questionnaires. Since our study included a clinical sample receiving support from NHS services, our results may be particularly relevant for clinicians working with service users with complex and enduring mental health difficulties.

Future work should focus on the exploration of the causal relationships between childhood trauma, EMS and CPTSD utilising longitudinal or prospective designs. The inclusion of larger sample sizes will be helpful in exploring the relative contribution of each schema domain in CPTSD severity. In addition, given that individuals who have suffered childhood trauma are more likely to be subsequently exposed to traumatic events in adulthood and to develop posttraumatic symptoms (Classen, Palesh, & Aggarwal, 2005), studies controlling for adult or later life traumatisation would be particularly interesting in order to better understand the relative contribution of each trauma type in the development of CPTSD in this population. Further, studies addressing confounding factors affecting posttraumatic symptom severity specifically in regard to the older adult population, such as mental and physical health difficulties, maladaptive coping strategies and neuropsychological factors [BLINDED] may also be helpful in further disentangling the relationship between trauma, EMS and CPTSD.

6. Conclusions

The results of the present study suggest that early maladaptive schemas mediate the relationship between childhood traumatic experiences and CPTSD. Disconnection and Impaired Autonomy domains may play a particularly important role in CPTSD symptom severity. These findings provide support for the theoretical underpinnings of the Schema

Therapy model and suggest the potential utility of cognitive interventions in reducing CPTSD severity in older people.

7. References

Ahmadian, A., Mirzaee, J., Omidbeygi, M., Holsboer-Trachsler, E., & Brand, S. (2015). Differences in maladaptive schemas between patients suffering from chronic and acute posttraumatic stress disorder and healthy controls. *Neuropsychiatric Disease and Treatment, 11*, 1677-1684. doi:10.2147/NDT.S85959

Atmaca, S., & Gençöz, T. (2016). Exploring revictimization process among Turkish women: The role of early maladaptive schemas on the link between child abuse and partner violence. *Child Abuse & Neglect, 52*, 85-93. doi:https://doi.org/10.1016/j.chiabu.2016.01.004

Bernstein, D. P., Ahluvalia, T., Pogge, D., & Handelsman, L. (1997). Validity of the Childhood Trauma Questionnaire in an adolescent psychiatric population. *Journal of the American Academy of Child & Adolescent Psychiatry, 36*(3), 340-348. doi:10.1097/00004583-199703000-00012

Bernstein, D. P., & Fink, L. (1998). *Childhood trauma questionnaire: A retrospective self-report.* San Antonio: Psychological Corporation.

Classen, C. C., Palesh, O. G., & Aggarwal, R. (2005). Sexual revictimization: A review of the empirical literature. Trauma, violence, & abuse, 6(2), 103-129. doi:https://doi.org/10.1177/1524838005275087

Cloitre, M., Courtois, C. A., Charuvastra, A., Carapezza, R., Stolbach, B. C., & Green, B. L. (2011). Treatment of complex PTSD: Results of the ISTSS expert clinician survey on best practices. *Journal of traumatic stress, 24*(6), 615-627. doi:10.1002/jts.20697

Cloitre, M., Garvert, D. W., Brewin, C. R., Bryant, R. A., & Maercker, A. (2013). Evidence for proposed ICD-11 PTSD and complex PTSD: a latent profile analysis. *European Journal of Psychotraumatology; Vol 4 (2013) incl Supplements*. doi:10.3402/ejpt.v4i0.20706

Cloitre, M., Shevlin, M., Brewin, C. R., Bisson, J. I., Roberts, N. P., Maercker, A., ... & Hyland, P. (2018). The International Trauma Questionnaire: development of a self- report measure of ICD- 11 PTSD and complex PTSD. *Acta Psychiatrica Scandinavica*, *138*(6), 536-546. doi:10.1111/acps.12956

Creech, S. K., Benzer, J. K., Liebsack, B. K., Proctor, S., & Taft, C. T. (2013). Impact of Coping Style and PTSD on Family Functioning After Deployment in Operation Desert Shield/Storm Returnees. *Journal of Traumatic Stress, 26*(4), 507-511. doi:10.1002/jts.21823

Dall, T. M., Gallo, P. D., Chakrabarti, R., West, T., Semilla, A. P., & Storm, M. V. (2013). An aging population and growing disease burden will require alarge and specialized health care workforce by 2025. *Health affairs, 32*(11), 2013-2020. doi:10.1377/hlthaff.2013.0714

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*(4), 319-345. doi:10.1016/S0005-7967(99)00123-0

Elklit, A., Hyland, P., & Shevlin, M. (2014). Evidence of symptom profiles consistent with posttraumatic stress disorder and complex posttraumatic stress disorder in different trauma samples. *European Journal of Psychotraumatology, 5*, 10.3402/ejpt.v3405.24221. doi:10.3402/ejpt.v5.24221

Estévez, A., Jauregui, P., Ozerinjauregi, N., & Herrero-Fernández, D. (2017). The Role of Early Maladaptive Schemas in the Appearance of Psychological Symptomatology in Adult Women Victims of Child Abuse. *Journal of Child Sexual Abuse, 26*(8), 889-909. doi:10.1080/10538712.2017.1365318

Foa, E. B., Ehlers, A., Clark, D. M., Tolin, D. F., & Orsillo, S. M. (1999). The posttraumatic cognitions inventory (PTCI): Development and validation. *Psychological assessment, 11*(3), 303.

Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological science*, *18*(3), 233-239.doi:10.1111/j.1467-9280.2007.01882.x

Gay, L. E., Harding, H. G., Jackson, J. L., Burns, E. E., & Baker, B. D. (2013). Attachment Style and Early Maladaptive Schemas as Mediators of the Relationship between Childhood Emotional Abuse and Intimate Partner Violence. *Journal of Aggression, Maltreatment & Trauma, 22*(4), 408-424. doi:10.1080/10926771.2013.775982

Goenjian, A. K., Najarian, L. M., Pynoos, R. S., Steinberg, A. M., Manoukian, G., Tavosian, A., & Fairbanks, L. A. (1994). Posttraumatic stress disorder in elderly and younger adults after the 1988 earthquake in Armenia. *Am J Psychiatry, 151*(6), 895-901. doi:10.1176/ajp.151.6.895

Harding, H. G., Burns, E. E., & Jackson, J. L. (2012). Identification of Child Sexual Abuse Survivor Subgroups Based on Early Maladaptive Schemas: Implications for Understanding Differences in Posttraumatic Stress Disorder Symptom Severity. *Cognitive Therapy and Research, 36*(5), 560-575. doi:10.1007/s10608-011-9385-8

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. London:Guilford Press.

Hiskey, S., Luckie, M., Davies, S., & Brewin, C. R. (2008). The phenomenology of reactivated trauma memories in older adults: A preliminary study. *Aging & Mental Health, 12*(4), 494-498. doi:10.1080/13607860802224367

Hoffart, A., Sexton, H., Hedley, L. M., Wang, C. E., Holthe, H., Haugum, J. A., ... & Holte, A. (2005). The structure of maladaptive schemas: A confirmatory factor analysis and a psychometric evaluation of factor-derived scales. *Cognitive Therapy and Research, 29*(6), 627-644.doi: https://doi.org/10.1007/s10608-005-9630-0

Hyland, P., Shevlin, M., Elklit, A., Murphy, J., Vallières, F., Garvert, D. W., & Cloitre, M. (2017). An assessment of the construct validity of the ICD-11 proposal for complex posttraumatic stress disorder. Psychological Trauma: Theory, Research, Practice, and Policy, 9(1), 1. doi:10.1037/tra0000114]. US: Educational Publishing Foundation.

Hyland, P., Shevlin, M., Brewin, C. R., Cloitre, M., Downes, A. J., Jumbe, S., ... & Roberts, N. P. (2017b). Validation of post- traumatic stress disorder (PTSD) and complex PTSD using the International Trauma Questionnaire. *Acta Psychiatrica Scandinavica*, 136(3), 313-322.

Innamorati, M., Erbuto, D., Venturini, P., Fagioli, F., Ricci, F., Lester, D., ... & Pompili, M. (2016). Factorial validity of the childhood trauma questionnaire in Italian psychiatric patients. *Psychiatry research*, 245, 297-302.

Karatzias, Jowett, S., Begley, A., & Deas, S. (2016). Early maladaptive schemas in adult survivors of interpersonal trauma: foundations for a cognitive theory of psychopathology. *European Journal of Psychotraumatology, 7*(1), 30713. doi:10.3402/ejpt.v7.30713

Karatzias, T., Cloitre, M., Maercker, A., Kazlauskas, E., Shevlin, M., Hyland, P., . . . Brewin, C. R. (2018). PTSD and Complex PTSD: ICD-11 updates on concept and measurement in the UK, USA, Germany and Lithuania. *European journal of psychotraumatology, 8*(sup7), 1418103-1418103. doi:10.1080/20008198.2017.1418103

Karatzias, T., Shevlin, M., Fyvie, C., Hyland, P., Efthymiadou, E., Wilson, D., . . . Cloitre, M. (2017). Evidence of distinct profiles of Posttraumatic Stress Disorder (PTSD) and Complex Posttraumatic Stress Disorder (CPTSD) based on the new ICD-11 Trauma Questionnaire (ICD-TQ). *J Affect Disord, 207*, 181-187. doi:10.1016/j.jad.2016.09.032

Kindynis, S., Burlacu, S., Louville, P., & Limosin, F. (2013). Effect of schema-focused therapy on depression, anxiety and maladaptive cognitive schemas in the elderly. *L'Encephale, 39*(6), 393-400. doi: 10.1016/j.encep.2013.04.002

Lumley, M. N., & Harkness, K. L. (2007). Specificity in the Relations among Childhood Adversity, Early Maladaptive Schemas, and Symptom Profiles in Adolescent Depression. *Cognitive Therapy and Research, 31*(5), 639-657. doi:10.1007/s10608-006-9100-3

MacDonald, K., Thomas, M. L., MacDonald, T. M., & Sciolla, A. F. (2014). A Perfect Childhood? Clinical Correlates of Minimization and Denial on the Childhood Trauma Questionnaire. *Journal of Interpersonal Violence, 30*(6), 988-1009. doi:10.1177/0886260514539761

MacDonald, K., Thomas, M. L., Sciolla, A. F., Schneider, B., Pappas, K., Bleijenberg, G., . . . Wingenfeld, K. (2016). Minimization of Childhood Maltreatment Is Common and Consequential: Results from a Large, Multinational Sample Using the Childhood Trauma Questionnaire. *PloS one, 11*(1), e0146058-e0146058. doi:10.1371/journal.pone.0146058

Maercker, A., Brewin, C. R., Bryant, R. A., Cloitre, M., Reed, G. M., van Ommeren, M., . . . Saxena, S. (2013). Proposals for mental disorders specifically associated with stress in the International Classification of Diseases-11. *The Lancet, 381*(9878), 1683-1685. doi:http://dx.doi.org/10.1016/S0140-6736(12)62191-6

Neupert, S. D., Almeida, D. M., & Charles, S. T. (2007). Age differences in reactivity to daily stressors: The role of personal control. *The Journals of Gerontology Series B:*

Psychological Sciences and Social Sciences, 62(4), P216-P225. doi:10.1093/geronb/62.4.P216

Oei, T. P. S., & Baranoff, J. (2007). Young Schema Questionnaire: Review of psychometric and measurement issues. *Australian Journal of Psychology, 59*(2), 78-86. doi:10.1080/00049530601148397

Parker, G., Lie, D., Siskind, D. J., Martin-Khan, M., Raphael, B., Crompton, D., & Kisely, S. (2016). Mental health implications for older adults after natural disasters--a systematic review and meta-analysis. *Int Psychogeriatr, 28*(1), 11-20. doi:10.1017/s1041610215001210

Pauwels, E., Claes, L., Dierckx, E., Debast, I., Van Alphen, S. P., Rossi, G., . . . Peuskens, H. (2014). Age neutrality of the young schema questionnaire in patients with a substance use disorder. *Int Psychogeriatr, 26*(8), 1317-1326. doi:10.1017/s1041610214000519

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior research methods, 36*(4), 717-731. doi:10.3758/BF03206553

Preacher, K. J., & Kelley, K. (2011). Effect size measures for mediation models: quantitative strategies for communicating indirect effects. *Psychological methods, 16*(2), 93. doi:10.1037/a0022658

Price, J. P. (2007). Cognitive schemas, defence mechanisms and post- traumatic stress symptomatology. *Psychology and Psychotherapy: Theory, Research and Practice, 80*(3), 343-353. doi:10.1348/147608306X144178

Pynoos, R. S., Steinberg, A. M., & Wraith, R. (1995). A developmental model of childhood traumatic stress. In D. Cicchetti & D. J. Cohen (Eds.), Wiley series on personality processes. Developmental psychopathology, Vol. 2. Risk, disorder, and adaptation (pp. 72-95). Oxford, England: John Wiley & Sons.

Rezaei, M., Ghazanfari, F., & rezaee, F. (2016). The role of childhood trauma, early maladaptive schemas, emotional schemas and experimental avoidance on depression: A structural equation modeling. *Psychiatry Research, 246*, 407-414. doi:https://doi.org/10.1016/j.psychres.2016.10.037

Roemmele, M., & Messman-Moore, T. L. (2011). Child Abuse, Early Maladaptive Schemas, and Risky Sexual Behavior in College Women. *Journal of Child Sexual Abuse, 20*(3), 264-283. doi:10.1080/10538712.2011.575445

Scher, C. D., Stein, M. B., Asmundson, G. J., McCreary, D. R., & Forde, D. R. (2001). The childhood trauma questionnaire in a community sample: psychometric properties and normative data. *J Trauma Stress, 14*(4), 843-857. doi:10.1023/a:1013058625719

Scottish Government (2017) The Mental Health Strategy. *Retrieved from https://www.gov.scot/publications/mental-health-strategy-2017-2027/*

Stoltenborgh, M., Bakermans- Kranenburg, M. J., Alink, L. R. A., & van Ijzendoorn, M. H. (2015). The prevalence of child maltreatment across the globe: Review of a series of meta- analyses. *Child Abuse Review, 24*(1), 37-50. doi:10.1002/car.2353

Tapia, G. (2018). The mediating role of early maladaptive schemas on relations between post-traumatic stress disorder symptom severity and illicit substance use disorder AU - Lecigne, Marion. *Journal of Substance Use, 23*(6), 634-639. doi:10.1080/14659891.2018.1489005

Thomson, P., & Jaque, S. V. (2019). History of childhood adversity and coping strategies: positive flow and creative experiences. *Child abuse & neglect, 90*, 185-192. doi:10.1016/j.chiabu.2018.12.019

[BLINDED]

van Genderen, H., Rijkeboer, M., Arntz, A., Vreeswijk, M. v., Broersen, J., & Nadort, M. (2012). *Theoretical Model.* In van Vreeswijk, M.F., Broersen, J., & Nadort, M. (Eds) The Wiley-Blackwell handbook of schema therapy: Theory, research, and practice. Oxford: Wiley-Blackwell.

Videler, A. C., Rossi, G., Schoevaars, M., Van der Feltz-Cornelis, C. M., & Van Alphen, S. P. J. (2014). Effects of schema group therapy in older outpatients: a proof of concept study. *International Psychogeriatrics, 26*(10), 1709-1717. doi:10.1017/S1041610214001264

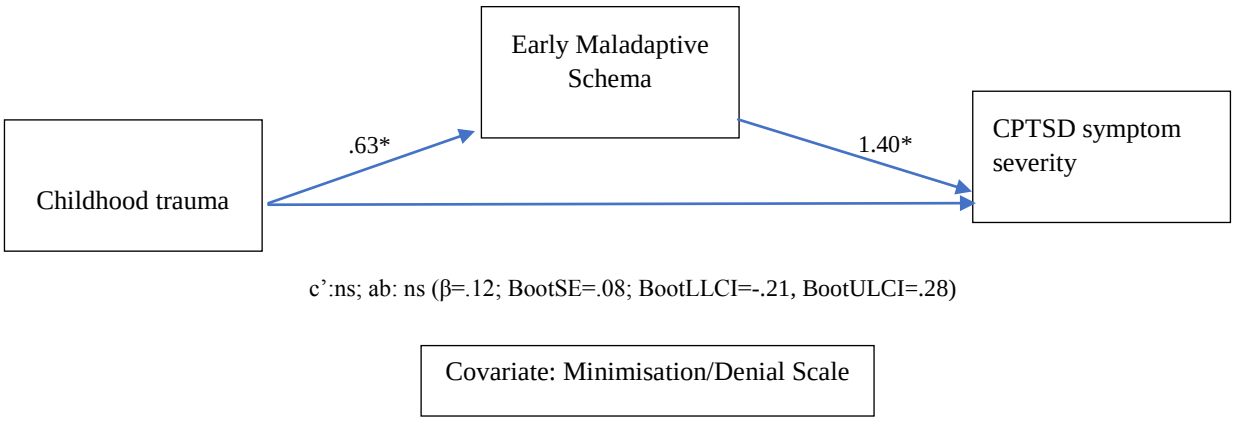
Videler, A., van Royen, R. R., & van Alphen, S. B. (2012). Schema therapy with older adults: call for evidence. International Psychogeriatrics, 24(7), 1186-1187. doi: https://doi.org/10.1017/S1041610211002638

Wright, M. O. D., Crawford, E., & Del Castillo, D. (2009). Childhood emotional maltreatment and later psychological distress among college students: The mediating role of maladaptive schemas. *Child Abuse & Neglect, 33*(1), 59-68. doi:http://dx.doi.org/10.1016/j.chiabu.2008.12.007

Young, J. E., Klosko, J. S., & Weishaar, M. E. (2003). *Schema therapy: A practitioner's guide*: Guilford Press.

Young, J.E (2014). *Young Schema Questionnaire-3.* New York: Cognitive Therapy Center.

Empirical Journal Appendix: Supplementary Figure 1



Supplementary Figure 1: Fourth mediation model and associated p-values (* p < 0.05, ** p < 0.01, ***p<0.001) of the pathway between childhood trauma, Exaggerated Standards and CPTSD symptom severity. Covariates: Minimisation/Denial scale. c' = direct effects of independent variable on dependent variable.

Chapter 3: Thesis portfolio appendices

Appendix A. Empirical Research: Author Guidelines for the British Journal of Clinical Psychology

Author Guidelines

The British Journal of Clinical Psychology publishes original contributions to scientific knowledge in clinical psychology and **Registered Reports**. This includes descriptive comparisons, as well as studies of the assessment, aetiology and treatment of people with a wide range of psychological problems in all age groups and settings. The level of analysis of studies ranges from biological influences on individual behaviour through to studies of psychological interventions and treatments on individuals, dyads, families and groups, to investigations of the relationships between explicitly social and psychological levels of analysis.

All papers published in The British Journal of Clinical Psychology are eligible for Panel A: Psychology, Psychiatry and Neuroscience in the Research Excellence Framework (REF).

The following types of paper are invited:

- Papers reporting original empirical investigations
- Theoretical papers, provided that these are sufficiently related to the empirical data
- Review articles which need not be exhaustive but which should give an interpretation of the state of the research in a given field and, where appropriate, identify its clinical implications
- Brief reports and comments

1. Circulation

The circulation of the Journal is worldwide. Papers are invited and encouraged from authors throughout the world.

2. Length

The word limit for papers submitted for consideration to BJCP is 5000 words and any papers that are over this word limit will be returned to the authors. The word limit does not include the abstract, reference list, figures, or tables. Appendices however are included in the word limit. The Editors retain discretion to publish papers beyond this length in cases where the clear and concise expression of the scientific content requires greater length. In such a case, the authors should contact the Editors before submission of the paper.

3. Submission and reviewing

All manuscripts must be submitted via **Editorial Manager**. The Journal operates a policy of anonymous (double blind) peer review. We also operate a triage process in which submissions that are out of scope or otherwise inappropriate will be rejected by the editors without external peer review to avoid unnecessary delays. Before submitting, please read the **terms and conditions of submission** and the **declaration of competing interests**. You may also like to use the **Submission Checklist** to help you prepare your paper.

By submitting a manuscript to or reviewing for this publication, your name, email address, and affiliation, and other contact details the publication might require, will be used for the regular operations of the publication, including, when necessary, sharing with the publisher (Wiley) and partners for production and publication. The publication and the publisher recognize the importance of protecting the personal information collected from users in the operation of these services, and have practices in place to ensure that steps are taken to maintain the security,

integrity, and privacy of the personal data collected and processed. You can learn more at **https://authorservices.wiley.com/statements/data-protection-policy.html**.

4. Manuscript requirements

• Contributions must be typed in double spacing with wide margins. All sheets must be numbered.

• Manuscripts should be preceded by a title page which includes a full list of authors and their affiliations, as well as the corresponding author's contact details. You may like to use **this template**. When entering the author names into Editorial Manager, the corresponding author will be asked to provide a CRediT contributor role to classify the role that each author played in creating the manuscript. Please see the **Project CRediT** website for a list of roles.

• The main document must be anonymous. Please do not mention the authors' names or affiliations (including in the Method section) and refer to any previous work in the third person.

• Tables should be typed in double spacing, each on a separate page with a self-explanatory title. Tables should be comprehensible without reference to the text. They should be placed at the end of the manuscript but they must be mentioned in the text.

• Figures can be included at the end of the document or attached as separate files, carefully labelled in initial capital/lower case lettering with symbols in a form consistent with text use. Unnecessary background patterns, lines and shading should be avoided. Captions should be listed on a separate sheet. The resolution of digital images must be at least 300 dpi. All figures must be mentioned in the text.

• All papers must include a structured abstract of up to 250 words under the headings: Objectives, Methods, Results, Conclusions. Articles which report original scientific research should also include a heading 'Design' before 'Methods'. The 'Methods' section for systematic reviews and theoretical papers should include, as a minimum, a description of the methods the author(s) used to access the literature they drew upon. That is, the abstract should summarize the databases that were consulted and the search terms that were used.

• All Articles must include Practitioner Points – these are 2–4 bullet points to detail the positive clinical implications of the work, with a further 2–4 bullet points outlining cautions or limitations of the study. They should be placed below the abstract, with the heading 'Practitioner Points'.

• For reference citations, please use APA style. Particular care should be taken to ensure that references are accurate and complete. Give all journal titles in full and provide DOI numbers where possible for journal articles.

• SI units must be used for all measurements, rounded off to practical values if appropriate, with the imperial equivalent in parentheses.

• In normal circumstances, effect size should be incorporated.

• Authors are requested to avoid the use of sexist language.

• Authors are responsible for acquiring written permission to publish lengthy quotations, illustrations, etc. for which they do not own copyright. For guidelines on editorial style, please consult the **APA Publication Manual** published by the American Psychological Association.

If you need more information about submitting your manuscript for publication, please email Vicki Pang, Editorial Assistant (**bjc@wiley.com**) or phone +44 (0) 1243 770 410.

5. Brief reports and comments

These allow publication of research studies and theoretical, critical or review comments with an essential contribution to make. They should be limited to 2000 words, including references. The abstract should not exceed 120 words and should be structured under these headings:

Objective, Method, Results, Conclusions. There should be no more than one table or figure, which should only be included if it conveys information more efficiently than the text. Title, author name and address are not included in the word limit.

6. Supporting Information

BJC is happy to accept articles with supporting information supplied for online only publication. This may include appendices, supplementary figures, sound files, videoclips etc. These will be posted on Wiley Online Library with the article. The print version will have a note indicating that extra material is available online. Please indicate clearly on submission which material is for online only publication. Please note that extra online only material is published as supplied by the author in the same file format and is not copyedited or typeset. Further information about this service can be found at **http://authorservices.wiley.com/bauthor/suppmat.asp**

7. Copyright and licenses

If your paper is accepted, the author identified as the formal corresponding author for the paper will receive an email prompting them to login into Author Services, where via the Wiley Author Licensing Service (WALS) they will be able to complete the license agreement on behalf of all authors on the paper.

For authors signing the copyright transfer agreement

If the OnlineOpen option is not selected the corresponding author will be presented with the copyright transfer agreement (CTA) to sign. The terms and conditions of the CTA can be previewed in the samples associated with the **Copyright FAQs**.

For authors choosing OnlineOpen

If the OnlineOpen option is selected the corresponding author will have a choice of the following Creative Commons License Open Access Agreements (OAA):

- Creative Commons Attribution Non-Commercial License OAA

- Creative Commons Attribution Non-Commercial -NoDerivs License OAA

To preview the terms and conditions of these open access agreements please visit the **Copyright FAQs**and you may also like to visit the **Wiley Open Access Copyright and Licence** page.

If you select the OnlineOpen option and your research is funded by The Wellcome Trust and members of the Research Councils UK (RCUK) or the Austrian Science Fund (FWF) you will be given the opportunity to publish your article under a CC-BY license supporting you in complying with your Funder requirements. For more information on this policy and the Journal's compliant self-archiving policy please visit our **Funder Policy** page.

8. Colour illustrations

Colour illustrations can be accepted for publication online. These would be reproduced in greyscale in the print version. If authors would like these figures to be reproduced in colour in print at their expense they should request this by completing a Colour Work Agreement form upon acceptance of the paper. A copy of the Colour Work Agreement form can be downloaded **here**.

9. Pre-submission English-language editing

Authors for whom English is a second language may choose to have their manuscript professionally edited before submission to improve the English. A list of independent suppliers of editing services can be found at **http://authorservices.wiley.com/bauthor/english_language.asp**. All services are paid for

and arranged by the author, and use of one of these services does not guarantee acceptance or preference for publication.

10. Author Services

Author Services enables authors to track their article – once it has been accepted – through the production process to publication online and in print. Authors can check the status of their articles online and choose to receive automated e-mails at key stages of production. The author will receive an e-mail with a unique link that enables them to register and have their article automatically added to the system. Please ensure that a complete e-mail address is provided when submitting the manuscript. Visit **http://authorservices.wiley.com/bauthor/** for more details on online production tracking and for a wealth of resources including FAQs and tips on article preparation, submission and more.

11. The Later Stages

The corresponding author will receive an email alert containing a link to a web site. A working e-mail address must therefore be provided for the corresponding author. The proof can be downloaded as a PDF (portable document format) file from this site. Acrobat Reader will be required in order to read this file. This software can be downloaded (free of charge) from the following web site: **http://www.adobe.com/products/acrobat/readstep2.html**.

This will enable the file to be opened, read on screen and annotated direct in the PDF. Corrections can also be supplied by hard copy if preferred. Further instructions will be sent with the proof. Excessive changes made by the author in the proofs, excluding typesetting errors, will be charged separately.

12. Early View

British Journal of Clinical Psychology is covered by the Early View service on Wiley Online Library. Early View articles are complete full-text articles published online in advance of their publication in a printed issue. Articles are therefore available as soon as they are ready, rather than having to wait for the next scheduled print issue. Early View articles are complete and final. They have been fully reviewed, revised and edited for publication, and the authors' final corrections have been incorporated. Because they are in final form, no changes can be made after online publication. The nature of Early View articles means that they do not yet have volume, issue or page numbers, so they cannot be cited in the traditional way. They are cited using their Digital Object Identifier (DOI) with no volume and issue or pagination information. E.g., Jones, A.B. (2010). Human rights Issues. Human Rights Journal. Advance online publication. doi:10.1111/j.1467-9299.2010.00300.x

Further information about the process of peer review and production can be found in this document: **What happens to my paper?** Appeals are handled according to **the procedure recommended by COPE**.

Appendix B: Empirical Research: Confirmation of ethical approval

North of Scotland Research Ethics Committee (1)
Summerfield House
2 Eday Road
Aberdeen
AB15 6RE

Telephone: 01224 558458
Facsimile: 01224 558609
Email: nosres@nhs.net

NHS Grampian

22 February 2018

Ms Eleni Vasilopoulou
School of Health in Social Science
The University of Edinburgh Medical School
Teviot Place
EDINBURGH
EH8 9AG

Dear Ms Vasilopoulou

Study title:	**The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years). A mediation analysis**
REC reference:	**17/NS/0117**
IRAS project ID:	**232957**

Thank you for your letter of 18 December 2017, responding to the Committee's request for further information on the above research and e-submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to make a request to postpone publication, please contact hra.studyregistration@nhs.net outlining the reasons for your request.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Conditions of the favourable opinion

The REC favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements. Each NHS organisation must confirm through the signing of agreements and/or other documents that it has given permission for the research to proceed (except where explicitly specified otherwise).

Guidance on applying for NHS permission for research is available in the Integrated Research Application System, www.hra.nhs.uk or at http://www.rdforum.nhs.uk.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of management permissions from host organisations.

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database within 6 weeks of recruitment of the first participant (for medical device studies, within the timeline determined by the current registration and publication trees).

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to request a deferral for study registration within the required timeframe, they should contact hra.studyregistration@nhs.net. The expectation is that all clinical trials will be registered, however, in exceptional circumstances non registration may be permissible with prior agreement from the HRA. Guidance on where to register is provided on the HRA website.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Evidence of Sponsor insurance or indemnity (non NHS Sponsors only)		04 August 2017
GP/consultant information sheets or letters [Clinician Information Sheet]	1	19 October 2017
GP/consultant information sheets or letters [GP Template - Research Participation]	2	18 December 2017
GP/consultant information sheets or letters [Clinician Template - MoCA Scores]	2	18 December 2017
GP/consultant information sheets or letters [GP Template - MoCA Scores]	2	18 December 2017
IRAS Application Form	232957/1178498/37/190	09 November 2017
IRAS Checklist XML [Checklist 21/02/2018]		21 February 2018
Non-validated questionnaire [Demographic Information Sheet]	2	18 December 2017
Other [SNM. Peer Review Template. Eleni Vasilopoulou. Version 1. 19 October 2017]	1	19 October 2017
Other [Debriefing Form]	2	18 December 2017
Other [Participants Details to Notify GP]	2	18 December 2017
Other [Participant Letter Template]	2	18 December 2017
Other [Care Protocol]	1	18 December 2017
Other [Student & Chief Investigator CV: Eleni Vasilopoulou]		18 December 2017
Other [Supervisor CV: Dr Azucena Guzman]		18 December 2017
Other [Response to Provisional Opinion]		18 December 2017
Participant consent form	2	18 December 2017
Participant information sheet (PIS)	2	18 December 2017
Research protocol or project proposal	2	18 December 2017
Summary, synopsis or diagram (flowchart) of protocol in non technical language	2	18 December 2017
Validated questionnaire [Childhood Trauma Questionnaire]		15 January 2018*
Validated questionnaire [International Trauma Questionnaire]	1.5.2	04 April 2017
Validated questionnaire [Young Schema Questionnaire. Page		15 January 2018*

1]		
Validated questionnaire [Young Schema Questionnaire. Page 2]		15 January 2018*
Validated questionnaire [Young Schema Questionnaire. Page 3]		15 January 2018*
Validated questionnaire [Montreal Cognitive Assessment (MoCA)]	7.1	15 January 2018*

*date received

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website:
http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/

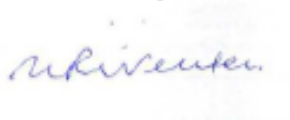
HRA Training

We are pleased to welcome researchers and R&D staff at our training days – see details at http://www.hra.nhs.uk/hra-training/

17/NS/0117	**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project.

Yours sincerely



Professor Nigel Webster
Chair

Enclosures: "After ethical review – guidance for researchers" SL-AR2

Copy to: Ms Charlotte Smith
Miss Melissa Taylor, NHS Lothian Research & Development Office

Appendix C: Empirical Research: Confirmation of ethical approval, Amendment 1

North of Scotland Research Ethics Committee
Summerfield House
2 Eday Road
Aberdeen
AB15 6RE

Telephone: 01224 558458
Facsimile: 01224 558609
Email: nosres@nhs.net

NHS Grampian

15 June 2018

Ms Eleni Vasilopoulou
School of Health in Social Science
The University of Edinburgh Medical School
Teviot Place
EH8 9AG

Dear Ms Vasilopoulou

Study title:	**The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years). A mediation analysis**
REC reference:	**17/NS/0117**
Amendment number:	**1 (Study Ref) AM01 (REC Ref)**
Amendment date:	**03 June 2018**
IRAS project ID:	**232957**

Approval was sought for the MoCA cut-off score to be reduced from 26 to 21.

The above amendment was reviewed by the Sub-Committee in correspondence.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

Document	*Version*	*Date*
Notice of Substantial Amendment (non-CTIMP)	1 (Study Ref) AM01 (REC Ref)	03 June 2018
Clinician Information Sheet - tracked changes	v2	03 June 2018
Clinician Template MoCA scores - tracked changes	v3	03 June 2018
GP Template MoCA scores - tracked changes	v3	03 June 2018

Research protocol or project proposal [- tracked changes]	v3	03 June 2018
Summary, synopsis or diagram (flowchart) of protocol in non technical language [- tracked changes]	v3	03 June 2018

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

Working with NHS Care Organisations

Sponsors should ensure that they notify the R&D office for the relevant NHS care organisation of this amendment in line with the terms detailed in the categorisation email issued by the lead nation for the study.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

We are pleased to welcome researchers and R & D staff at our Research Ethics Committee members' training days – see details at http://www.hra.nhs.uk/hra-training/

17/NS/0117:	**Please quote this number on all correspondence**

Yours sincerely

Professor Nigel Webster
Chair

Enclosures: List of names and professions of members who took part in the review

Copy to: Miss Melissa Taylor, NHS Lothian Research & Development Office

Appendix D: Empirical Research: Confirmation of ethical approval, Amendment 2

North of Scotland Research Ethics Service
Summerfield House
2 Eday Road
Aberdeen
AB15 6RE

Telephone: 01224 558458
Facsimile: 01224 558609
Email: nosres@nhs.net

NHS Grampian

4 September 2018

Ms Eleni Vasilopoulou
School of Health in Social Science
The University of Edinburgh Medical School
Teviot Place
EDINBURGH
EH8 9AG

Dear Ms Vasilopoulou

Study title: **The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years). A mediation analysis**
REC reference: **17/NS/0117**
Amendment number: **2**
Amendment date: **30 August 2018**
IRAS project ID: **232957**

The above amendment was reviewed by the Sub-Committee in correspondence.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

Document	*Version*	*Date*
GP/consultant information sheets or letters: Clinician Information Sheet	4	30 August 2018
GP/consultant information sheets or letters: GP Template - Research Participation	3	26 August 2018
Notice of Substantial Amendment (non-CTIMP)	2	30 August 2018
Participant Information Sheet (PIS)	4	26 August 2018
Research protocol or project proposal	5	30 August 2018
Summary, synopsis or diagram (flowchart) of protocol in non technical language	5	30 August 2018

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

Working with NHS Care Organisations

Sponsors should ensure that they notify the R&D office for the relevant NHS care organisation of this amendment in line with the terms detailed in the categorisation email issued by the lead nation for the study.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

We are pleased to welcome researchers and R & D staff at our Research Ethics Committee members' training days – see details at http://www.hra.nhs.uk/hra-training/

17/NS/0117:	**Please quote this number on all correspondence**

Yours sincerely

Professor Nigel Webster
Chair

Enclosures: List of names and professions of members who took part in the review

Copy to: Miss Melissa Taylor, NHS Lothian Research & Development Office

Appendix E: Confirmation of local approval (most recent amendment): NHS Lothian

University Hospitals Division

NHS Lothian

Queen's Medical Research Institute
47 Little France Crescent, Edinburgh, EH16 4TJ

RESEARCH & DEVELOPMENT
Room E1.16
Tel: 0131 242 3330
Email:
R&DOffice@nhslothian.scot.nhs.uk

Director:
Professor Tim Walsh

KS/LM

21 March 2019

Ms Eleni Vasilopoulou
Royal Edinburgh Hospital
NHS Lothian
Psychology Department
Mackinnon House
Edinburgh
EH10 5HF

Dear Ms Vasilopoulou

REC No:	17/NS/0117
R&D Project ID No:	2018/0055
Amendment:	Substantial amendment No.2 dated 30 August 2018
Title of Research:	The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years). A mediation analysis

I am writing in reply to recent correspondence in relation to an amendment(s) to the above project and the subsequent updated documents as follows.

- Flowchart Version 5, dated 30 August 2018
- GP Letter Version 3, dated 26 August 2018
- Participant Information Sheet (Clinician) Version 4, dated 30 August 2018
- Participant Information Sheet Version 4, dated 26 August 2018
- Protocol Version 5, dated 30 August 2018

We have now assessed any consequential changes and can confirm that NHS Lothian management approval is extended to cover the specific changes intimated.

Yours sincerely

Kenneth Scott

Mr Kenneth Scott
NRS Generic Review Manager

Appendix F: Confirmation of local approval (most recent amendment): NHS Fife

Medical Director

Hayfield House
Hayfield Road
KIRKCALDY
KY2 5AH

NHS Fife

Ms Eleni Vasilopoulou
School of Health in Social Science
The University of Edinburgh Medical School
Teviot Place
EDINBURGH
EH8 9AG

Date 2 October 2018
Our Ref 18-011 232957
17/NS/0117
Enquiries to Aileen Yell
E-mail aileenyell@nhs.net
Telephone 01383 623623 Ext 20940
Website www.nhsfife.org

Dear Ms Vasilopoulou

Project Title : The relationship between childhoold traumatic events, early maladaptive schemas and complex post-traumatic stress disorder symptoms among older adults (>64 years). A mediation analysis

Amendment No 2 dated 30 August 2018

Thank you for submitting a copy of the following documents in relation to the above study currently being conducted within NHS Fife :-

Document	Version	Date
Participant Information Sheet	4	26 August 2018
GP template – Research Participation	3	26 August 2018
Protocol	5	30 August 2018
Clinician Information Sheet	4	30 August 2018
Flowchart	5	30 August 2018
Notice of Substantial Amendment	2	30 August 2018
REC favourable opinion letter for amendment		4 September 2018

Following review, NHS Fife has decided that they can accommodate this amendment. The amendment may therefore be immediately implemented at this site under the existing NHS permission, subject to resource/capacity. Please note that you may only implement changes that were described in the amendment documentation detailed above.

Yours sincerely

DR FRANCES ELLIOT
Medical Director
NHS Fife

Cc : Aileen Yell, R&D Research Coordinator, NHS Fife, Queen Margaret Hospital, Dunfermline

NHS Fife was awarded the Carbon Trust Standard in February 2010 and is the first Scottish NHS Board to achieve this accolade.

Appendix G: Confirmation of local approval (most recent amendment): NHS Forth Valley

NHS Forth Valley

Carseview House
Castle Business Park
Stirling
FK9 4SW

Telephone:
Fax:

NHS Forth Valley

Ms Eleni Vasilopoulou School of Health in Social Science The University of Edinburgh Medical School Teviot Place Edinburgh EH8 9AG	Date	24 October 2018
	Your Ref	
	Our Ref	
	Enquiries to	Direct line: 01324 214690 Email: FV-UHB.RandD-depart@nhs.net
	R&D ref	FV1086

Dear Ms Vasilopoulou

Study title: The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years). A mediation analysis
REC reference: 17/NS/0117
Amendment number: 2
Amendment date: 30 August 2018

Further to R&D management approval of this study on 14 March 2018, I am writing to confirm that NHS Forth Valley will accept the Amendment(s) detailed above as given a favourable opinion by the North of Scotland Research Ethics Committee on 4 September 2018.

Yours sincerely

pp
MR. ANDREW MURRAY
Medical Director

CC:
Azucena.guzman@ed.ac.uk

List of documents approved

Document	*Version*	*Date*
GP/consultant information sheets or letters: Clinician Information Sheet	4	30 August 2018
GP/consultant information sheets or letters: GP Template - Research Participation	3	26 August 2018
Notice of Substantial Amendment (non-CTIMP)	2	30 August 2018
Participant Information Sheet (PIS)	4	26 August 2018
Research protocol or project proposal	5	30 August 2018
Summary, synopsis or diagram (flowchart) of protocol in non technical language	5	30 August 2018

Appendix H: Confirmation of local approval (most recent amendment): NHS Lanarkshire

NHS Lanarkshire R&D Amendment Approval : Childhood traumatic events, schemas and complex trauma symptoms- V2 (**L18019**)

Ms Eleni Vasilopoulou
Royal Edinburgh Hospital
NHS Lothian
Psychology Department
Mackinnon House
Edinburgh
EH10 5HF
eleni.vasilopoulou@nhslothian.scot.nhs.uk

R&D Department
Corporate Services Building
Monklands Hospital
Monkscourt Avenue
AIRDRIE
ML6 0JS

Date 04/10/2018

Enquiries Elaine McHugh 01236 712447
elaine.mchugh@lanarkshire.scot.nhs.uk
Pamela McCahill 01236 712445
pamela.mccahill@lanarkshire.scot.nhs.uk
R&D Facilitator Raymond Hamill
01236 712446
raymond.hamill@lanarkshire.scot.nhs.uk

Dear Ms Vasilopoulou

Childhood traumatic events, schemas and complex trauma symptoms- V2
***Full title** : The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years). A mediation analysis*

Project ID: L18019 **IRAS No:** 232957 **NRS ID:**NRS18/232957

Investigator
Dr Susan Ross

NHS Lanarkshire site
NHS Lanarkshire

Amendment	Category	REC date	R&D approval
02	Substantial (NRS: **A**)	04/09/2018	01/10/2018

I am writing to you as Chief Investigator of the above study in reference to the above listed Amendment(s).

I confirm that your original R&D Management Approval has not been affected by this Amendment, and it can therefore be implemented within NHS Lanarkshire as detailed above, subject to all regulatory approvals. NHS Lanarkshire reserves the right to revoke Management Approval should any unfavourable opinions be received. I note that it is the responsibility of the Principal Investigator(s) to carry out any changes to be made to the project as a result.

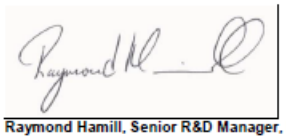
Any documents approved are listed in Table 1, overleaf.

PLEASE NOTE: It is the responsibility of the Principal Investigator to inform the R&D Department of any significant findings identified as a result of a Monitoring Visit.

L18019_SA02_30.08.18_CatA_ManagementApproval

‘

I trust these conditions are acceptable to you.



Raymond Hamill, Senior R&D Manager, NHS Lanarkshire

c.c.

NAME	ROLE	EMAIL
Derek Esson	Trials Nurse	Derek.Esson@lanarkshire.scot.nhs.uk
Dr Susan Ross	PI for NHS Lanarkshire	susanross@nhs.net
Ms Charlott Smith	Sponsor contact	charlotte.smith@ed.ac.uk

Table 1:

Document	*Version*	*Date*
GP/consultant information sheets or letters: Clinician Information Sheet	4	30 August 2018
GP/consultant information sheets or letters: GP Template - Research Participation	3	26 August 2018
Notice of Substantial Amendment (non-CTIMP)	2	30 August 2018
Participant Information Sheet (PIS)	4	26 August 2018
Research protocol or project proposal	5	30 August 2018
Summary, synopsis or diagram (flowchart) of protocol in non technical language	5	30 August 2018

Appendix I: Empirical Research documents: Study protocol (latest version: 30.08.18)

Study Protocol: The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years): A mediation analysis.

Protocol Author: Eleni Vasilopoulou

List of Abbreviations

CBT	Cognitive Behavioural Therapy
CTQ	The Childhood Trauma Questionnaire
CPTSD	Complex Post Traumatic Stress Disorder
EMS	Early Maladaptive Schema
ICD-11	11th Revision of the International Classification of Diseases
MHAS	Mental Health Assessment Service
NHS	National Health Service
OA	Older Adults
PTSD	Post Traumatic Stress Disorder

Background

Complex Post-traumatic symptoms in Older Adults

Complex Posttraumatic Stress Disorder (CPTSD) has been proposed for inclusion in the 11th Revision of the International Classification of Diseases (ICD-11) as a sibling condition to Posttraumatic Stress Disorder (PTSD) (Maercker et al., 2013). In contrast to PTSD which can be triggered by a single event, CPTSD is viewed as a result of exposure to cumulative trauma, particularly in childhood. In addition to PTSD symptoms (re-experiencing,

avoidance/numbing, and hyperarousal/hypervigilance), CPTSD also includes symptom clusters that highlight self-organisation disturbances (affective dysregulation, negative self-concept and disturbances in relationships) (Karatzias et al., 2017).

The conceptualisation of PTSD and CPTSD, as distinct symptom entities, related to the nature of the trauma exposure, has been supported by a number of studies (Cloitre et al., 2013; Cloitre et al., 2014; Elklit et al., 2014; Hyland et al., 2017; Karatzias et al., 2017; Knefel et al., 2015; Murphy et al., 2016; Perkonigg et al., 2016). Results have indicated that the symptoms of adults who have experienced trauma form classes consistent with the diagnostic criteria of PTSD and CPTSD as per ICD-11. Specifically, findings have revealed (a) a CPTSD class characterised both by PTSD symptoms and disturbances in the three self-organization domains (b) a PTSD class characterised by elevated PTSD symptoms but low scores on the self-organisation domains. In addition, findings have shown a stronger association between early cumulative trauma and complex PTSD symptomatology while single-event trauma was more strongly associated with PTSD (Cloitre et al., 2013; Elklit et al., 2014; Hyland et al., 2017; Karatzias et al., 2017). CPTSD was also associated with more severe functional impairment when compared to PTSD (Cloitre et al., 2013; Elklit et al., 2014; Karatzias et al., 2017; Perkonigg et al., 2016).

Unfortunately, there is a dearth of research regarding how complex post-traumatic symptoms manifest themselves in later life. Previous research on PTSD suggests that older adults who have experienced trauma may present differently to other age groups due to the biological, psychological and social changes that are associated with aging. Specifically, a proposed decrease in physical resilience as individuals age, may compromise older adults' ability to manage trauma-related memories and feelings (Op den Velde et al., 1996). Health difficulties such as cancer, stroke, delirium, or falls, more strongly associated with the older adult population, have been found to trigger or exacerbate PTSD symptoms (Jayasinghe et al., 2014; Moye & Rouse, 2014). In addition, PTSD has been associated with structural and functional changes in brain regions, such as decreased hippocampal gray matter (Gianaros et al., 2007). It is possible that cognitive decline observed in healthy aging may aggravate some of the cognitive deficits associated with chronic stress exposure, leading to poorer functioning and more severe trauma symptomatology among older adults (Cook & Simiola, 2017; Solomon et al., 2009; van Zelst et al., 2006).

Furthermore, societal implications such as a historical lack of knowledge regarding post-traumatic stress among older adults or the misattribution of distress-related symptoms to physical conditions may also impose some differences in how older adults cope with early traumatic events (Averill & Beck, 2000). Indeed, it has been suggested that older adults may not recognise the potential negative effects of trauma and may fail to disclose those to healthcare providers. This could result in older adults having limited access to appropriate support (Cook & Simiola, 2017).

On the other hand, social and emotional processes of aging may positively affect adaptation to trauma (Charles & Carstensen, 2010). For example, according to the theory of socio-emotional selectivity older adults tend to experience higher degree of satisfaction with their social networks, compared to other age groups (Carstensen et al., 2003; Carstensen et al.,

1999; Charles & Carstensen, 2010; Fung et al., 2001). Perceived social support has been identified as a significant protective factor in the development and maintenance of PTSD among adults (Boscarino, 1995; Brewin et al., 2000; Ozbay et al., 2007; Southwick et al., 2005). Therefore, older adults' increased capacity to form and maintain meaningful relationships may enhance their capacity to cope with trauma.

Finally, research has suggested a tendency among older adults to show emotionally rewarding memory distortion for past experiences compared to younger adults (Mather & Carstensen, 2005). This is also true for stressful events with older adults appraising and remembering such events less negatively with age (Neupert et al., 2007). The development and maintenance of PTSD symptomatology is strongly influenced by the person's posttraumatic appraisals (Ehlers & Clark, 2000). It is therefore possible that older adults' tendency to appraise events more positively may allow them to better adapt to earlier life experiences, thereby alleviating some of the negative consequences of trauma.

Some differences between older adults and adults with PTSD have been observed in terms of symptom profiles (Goenjian et al., 1994) and symptom severity (Acierno et al., 2006). Research has supported the notion of a protective effect of age in post-traumatic symptoms (Norris et al., 2002) with older adults reporting fewer symptoms of PTSD when compared to younger populations (Acierno et al., 2006). However, these results are not consistent across studies (Parker et al., 2016), which may be due to the fact that older adults are a heterogeneous group with varying experiences, needs and coping skills. In addition, there is limited information about how individual factors within the older adult group impact on trauma presentation and severity.

Risk factors for the development of post-traumatic symptoms: Early Maladaptive Schemas

Exposure to traumatic events is not always sufficient to explain the emergence of PTSD or CPTSD symptomatology. Indeed, only a small percentage of people experiencing childhood traumatic events will go on to develop trauma symptoms (A. Perkonigg et al., 2000). Thus, there is growing acceptance of the role that individual vulnerability factors play in the emergence of these conditions (Southwick et al., 2005; Yehuda et al., 2006).

Cognitive schemas are defined as subjective patterns consisting of memories, emotions, and cognitions which guide behaviour (Young 1990, 1999). Young (1990, 1999) proposed a subset of schemas concerning oneself and one's relationships with others which develop in response to childhood adversity. These schemas were labelled as Early Maladaptive Schemas (EMS) and were defined as 'extremely stable and enduring themes, comprised of memories, emotions, cognitions, and bodily sensations, regarding oneself and one's relationship with others, that develop during childhood and are elaborated upon throughout the individual's life-time, and that are dysfunctional to a significant degree' (Young et al., 2003, p. 7). EMS can have a long-lasting impact on individuals interfering with how they view themselves and their interaction with others (Young et al., 2003). EMS can lead to the development of psychopathology if activated by situations relevant to a particular schema.

Research has demonstrated the role of EMS in mediating the link between childhood abuse and psychopathology (Calvete et al., 2007; Lumley & Harkness, 2007; Wright et al., 2009). In regard to post-traumatic stress, EMS have been shown to be significant predictors of PTSD, among adults who have experienced traumatic events (Ahmadian et al., 2015; Price, 2007). Schemas within the "Disconnection and Rejection" and the "Impaired autonomy" domains have been more strongly associated with PTSD (Harding et al., 2012; Thanos Karatzias et al., 2016; Price, 2007). To our knowledge no studies have investigated the role of EMS in the development of CPTSD symptoms within the older adult population.

Limitations of previous research

Although the risk and protective factors for the development of PTSD have been extensively researched in the adult population (Brewin et al., 2000), there is limited research about the factors affecting CPTSD symptoms in older adults (age 64> years). To our knowledge only one study has sought to examine mediators between experiencing potentially traumatic events and complex post traumatic symptomatology in older adults. Krammer et al. (2016) examined the association between traumatic events in childhood and complex posttraumatic stress symptoms in older adults. The authors investigated the mediation of this association by two social-interpersonal factors: social acknowledgment as a survivor and dysfunctional disclosure

Participants completed the TSI scale (Briere, 1995) which assessed a broader spectrum of post-traumatic symptoms, such as anxious arousal, depression, anger/irritability, intrusive experiences, defensive avoidance, dissociation, sexual concerns, dysfunctional sexual behaviour, impaired self-reference, and tension reduction behaviour. Exposure to childhood traumatic events was found to be significantly associated with PTSD symptoms and this relationship was partially mediated by social acknowledgment and dysfunctional disclosure. In addition, childhood trauma was associated with impaired self-reference. However, this scale failed to measure the two remaining core clusters of CPTSD symptoms as per ICD-11 (affective dysregulation, and disturbances in relationships) providing limited results about CPTSD symptoms within this age group. Moreover, this study failed to examine the role of cognitive processes which may mediate the adverse effects of early trauma.

The current study aims to address these limitations by examining whether specific EMS mediate the relationship between early traumatic events and trauma symptoms in a clinical sample of older adults. The study will first investigate which specific schema domains are more strongly associated with CPTSD symptom severity, while controlling for the effect of early traumatic events. Schema more strongly associated with CPTSD symptoms will then be entered into a mediation analysis to assess whether they mediate the relationship between early traumatic events and trauma symptom severity.

A better understanding of the risk factors in the development of trauma symptomatology within OA is important when considering the assessment and early identification of traumatised OA. In addition, such an understanding could increase our knowledge of how to respond to and support older people with trauma. In particular, if a positive mediating relationship is established, this study could guide the focus of future complex trauma

interventions (e.g. CBT) by specifying which schema domains need to be targeted in order to alleviate distress in older people with CPTSD symptoms. This is paramount in the development of accessible services appropriate to the needs of OA and is in line with UK policies aiming to reduce health inequalities and promote wellbeing across the lifespan (The Scottish Government, 2011)

Principal Research Question

Do Early Maladaptive Schema mediate the relationship between childhood traumatic events and complex post traumatic symptoms in older adults?

Secondary research question

Which second order Schema factor (domain) is a stronger mediator of the relationship between childhood trauma and post-traumatic symptoms in older adults?

Methodology

Design

The study will use a cross-sectional, quantitative design. Older adults (age> 64 years) who have experienced childhood traumatic events will be invited to complete four questionnaires, measuring childhood trauma, early maladaptive schema (EMS), CPTSD symptoms as well as a demographic questionnaire. A series of mediation analyses will be utilised in order to answer the research questions associated with the current study.

Participants

Inclusion criteria: Older adults (>64) with a history of childhood trauma (physical abuse, sexual abuse, emotional abuse, physical neglect, emotional neglect) will be eligible for participation. In order to participate in the study service users would need to be willing to participate voluntarily and to be able to give written informed consent.

Exclusion criteria: Older adults with a diagnosis of Mild Cognitive Impairment or Dementia will be excluded from the study as this may influence the accuracy of the findings. Older adults who lack fluency in English will also be excluded. Finally, for ethical reasons and to ensure individuals' safety, older adults in crisis, experiencing suicidal thoughts with clear intent to harm themselves will also be excluded from this study. The study will also exclude individuals who lack capacity to consent to research.

Inclusion Criteria	Exclusion Criteria
• Older adults (>64) • Individuals with a history of childhood trauma (such as physical abuse, sexual abuse, emotional abuse, physical neglect, emotional neglect) • Individuals willing to participate voluntarily	• Older adults with a diagnosis of Dementia or Mild Cognitive Impairment. • Older adults who lack

• Individuals able to give written informed consent.	fluency in English • Older adults in crisis, experiencing suicidal thoughts with clear intent to harm themselves • Individuals lacking capacity to consent to research.

Procedure

There will be two recruitment pathways to this study: 1. Through NHS Older People's Community Mental Health Teams and 2. Through Day Hospitals

The researcher will present the study protocol to Older People's Community Mental Health Teams meetings explaining the purpose of the study, study rationale and recruitment process. The researcher will also contact Day Hospitals across the four NHS boards to ask for support with the recruitment process. Following this, NHS staff will be encouraged to identify potential participants from their caseloads who meet inclusion and exclusion criteria. Individuals at any stage of therapy could participate. Clinicians will have access to service users' records and will be aware of a diagnosis of MCI or Dementia. The researcher will not access these records.

Clinicians will be given information sheets to pass on to service users. The information sheet will outline the following: (a) study aims, (b) participant involvement and opportunity to withdraw from research, (c) confidentiality and anonymity, (d) data storage (e) data dissemination (f) complaints procedure and (g) support resources and available services. Potential participants will also be made aware that the study will include a screening measure to exclude individuals with cognitive impairment, as well as the steps that the researcher would undertake if there was an indication of cognitive impairment: (1) discuss with participants (2) contact participant's GP and (3) contact participants' clinician. In addition, the information sheets would state that the participants' GP would be made aware of their participation in the study, as recommended by the NHS Health Research Authority (Health Research Authority, 2017). The information sheet will also state that involvement in the study will not affect the healthcare participants receive and that they will be free to withdraw at any time without giving reason.

Clinicians will be asked to request service users' verbal consent for the researcher to contact them in order to provide them with more information about the study. Clinicians will then be asked to telephone the researcher with the potential participant's details.

Following a period of at least 24 hours, the researcher will telephone potential participants who expressed an interest in the study and who gave their permission to be contacted. During

this contact, the researcher will briefly confirm that individuals meet inclusion criteria. Potential participants will have the opportunity to ask any questions.

If individuals are still interested in taking part, a meeting will be arranged in which they will have further opportunity to ask questions and provide written consent to participate. An effort to provide flexibility as to the time, date and venue of their meeting will be made. The meeting will be conducted in NHS premises. If participants have been referred by clinicians in Older Adult teams, the possibility of a home visit will be discussed with the clinician. If no risk is identified, the option to complete the measures at the participant's home will be offered. The researcher will be accompanied by another member of staff as outlined in the NHS Lone Worker policy.

The researcher will not conduct a formal assessment of participants' capacity to consent to research. However, upon meeting the researcher potential participants will be asked questions regarding their understanding of (a) the aims of the study; (b) what they will be asked to do and (c) the potential benefits/risks of participating. The Adults with Incapacity (Scotland) Act 2000 defines incapacity as being incapable of:

a) acting; or

b) making decisions; or

c) communicating decisions; or

d) understanding decisions; or

e) retaining the memory of decisions

If, during the study, the researcher becomes concerned that the participant might be incapable or acting on, making decisions, communication decisions, understanding decisions, or retaining the memory of decisions, participant involvement will be immediately terminated and all study documentation relating to that participant will be deleted.

If potential participants are considered to have capacity they will be asked to sign the written informed consent form in order to be considered for inclusion in the study. Participants who agree to participate will be given a copy of the consent form. Only individuals who provide written consent will be included in the study.

During contact, the researcher will ask respondents to provide the following details: Name, Address, DOB, GP Name and GP practice in order to notify the GP of their participation.

Following this, participants will be asked to complete the demographic questionnaires as well as the battery of measures outlined below, lasting in total approximately 55 minutes.

If participants display distress during this process, follow-up support would be provided: At first instance, the researcher would manage the participants' distress in session. If additional support is needed, then the researcher will sign-post the participants to helpline numbers and available services. However, if the researcher became concerned of risk of harm to the participant or others they will be obliged to share this information and follow service protocols. This may include contacting crisis centres (MHAS), the participants' GP or

clinician. The researcher's Clinical Supervisor who has experience working with older adults will oversee this process. For further information please refer to the study's Care Protocol.

Data Collection

Participants will be invited to complete questionnaires measuring CPTSD symptoms, childhood traumatic events and early maladaptive schemas, Participants will also complete a demographic questionnaire enquiring about gender, age, marital status, occupational status, socioeconoming status, current living situation and co-existing medical conditions. The above demographic data will be collected in order to provide information about the sample of respondents and are relevant when conducting trauma research in older adults (Acierno et al., 2006; Norris et al., 2002; Ogle et al., 2013; Ross & Van Willigen, 1997). Therefore, a battery of four questionnaires will be completed on one occasion. The measures will be completed in the following order: 1.. Demographic Questionnaire; 2. Childhood Trauma Questionnaire; 3. Young Schema Questionnaire; 4. ICD-11 Trauma Questionnaire. Measure completion is likely to last approximately 55 minutes. Participants will be advised that appointments will last approximately one hour. They will be advised that they have to option to take breaks if necessary.

Study Measures:

Childhood Trauma Questionnaire (Bernstein & Fink, 1998): Exposure to childhood traumatic events will be measured by the Childhood Trauma Questionnaire. The CTQ is a 28-item retrospective self-report questionnaire which includes five subscales: Emotional Abuse, Physical Abuse, Sexual Abuse, Emotional Neglect, and Physical Neglect. In addition, the questionnaire includes a Minimization/Denial scale in order to identify the underreporting of traumatic events. Participants will be asked to respond to each question on a 5-point scale ranging from "never true" (1) to "very often true" (5). The CTQ has demonstrated strong psychometric properties when used both in clinical and community settings (Bernstein et al., 1997; Scher et al., 2001).

Young Schema Questionnaire – Short Form, 3rd Edition (Young, 2014): The Young Schema Questionnaire – Short Form, 3rd Edition (YSQ-S3) will be used to measure Early Maladaptive Schemas (EMS). The YSQ-S3 is a self-report measure assessing 18 EMS. Each EMS consists of five items, resulting in 90 items in total. The items are categorized in four schema factors which replaced Young's previous five schema domains (Young, 2003): Disconnection, Impaired Autonomy, Exaggerated Standards, and Impaired Limits (Hoffart, et al., 2006). . Participants will be asked to rate descriptive statements on a 6-step Likert-scale which ranges from "completely untrue of me" to "describes me perfectly". The YSQ-S3 provides a total score. Higher values are associated with a stronger presence of EMS. This measure has demonstrated good psychometric properties and has shown age neutrality when administered across the lifespan (Oei & Baranoff, 2007; Pauwels et al., 2014).

ICD 11 Trauma Questionnaire (ITQ; Version 1.2) (Cloitre et al., 2014): PTSD and CPTSD symptoms will be measured by the ITQ. The ITQ is a 23-item self-report measure which assesses the following symptoms areas: Re-experiencing, Avoidance, Sense of Threat as well

as affective dysregulation, negative self-concept and disturbances in relationships. Participants are asked to select on a Likert scale how much a symptom has been bothersome in the past month, with scores ranging from 0 (not at all) to 4 (extremely). A recent psychometric evaluation of the ITQ has indicated good psychometric properties for this measure (Karatzias et al., 2016).

Total Time to Complete Measures: Approximately 55 minutes

ITQ: 5 minutes (additional time for OA: 10 minutes)

CTQ: 5 minutes (Additional time for OA: 10 minutes)

Young Schema Questionnaire: 15 minutes (+10 minutes)

Demographic Questionnaire: 5 minutes

Sample Size

Sample size calculations were based upon the primary research question. (Fritz & MacKinnon, 2007) have published guidelines in regard to obtaining an adequate sample size for mediation analysis. The authors proposed a minimum number of participants to achieve 0.8 power depending on the magnitude of the estimated effect sizes for the '*a'* and '*b'* mediation pathways. Previous research (Anilmis et al., 2015) has indicated large effect sizes for the '*a'* pathway (the relationship between Childhood traumatic events and cognitive beliefs). (Foa et al., 1999) have also indicated large effect sizes for the '*b'* pathway (the relationship between cognitive schemas and post-traumatic symptoms). Based on these findings Fritz and MacKinnon (2007) suggest a sample size of 34 in order for this study to be adequately powered. The researcher will seek to recruit a sample size of 71 participants as this would also allow for the detection of moderate effects for the '*a'* and '*b'* pathways.

The secondary question will be examined using parallel mediation analyses. In order to calculate the sample size needed to answer this question, Monte-Carlo simulations were performed using the "Shiny" programme, written in R statistical computing language (R Core Team, 2016) and according to published guidelines (Alexander et al., 2017). These showed that the aforementioned sample size (71) would not provide sufficient power to answer this question. Given the time-limitations of this project, it would not be possible to increase the sample size. Therefore, these analyses will be regarded as exploratory and will only aim at providing preliminary data to inform the planning of future studies. The focus of these analyses will be on quantifying the magnitude of any relationships and their 95% confidence intervals.

The researcher's academic and clinical supervisors have previous experience in supervising studies in OA and have stated that it should be feasible to recruit this sample size across NHS Lothian, NHS Fife, NHS Forth Valley and NHS Lanarkshire.

Analysis

Mediation analysis (Hayes, 2013) will be implemented to answer the primary research question. Hayes PROCESS macro Model 4 (Hayes, 2013) for SPSS will be used to analyse the data. As suggested by Hayes (2013) direct and indirect effects will be calculated together with the constituent components of the indirect effect (i.e. the effect of early traumatic events on cognitive schema and the effect of cognitive schema on complex trauma symptoms).

Bootstrapped sampling distribution will be used to estimate the indirect effect, the standard error and 95% confidence intervals for the population value of 'ab' (Preacher & Hayes, 2004). Bootstrapping does not assume normality in the distributions of the variables or the sampling distribution of the statistic, and can therefore be applied to small samples with more confidence (Preacher & Hayes, 2004).

Effect sizes will be reported and interpreted according to Preacher and Kelley's (2011) guidelines. The authors recommend a new standardised value to express effect size for mediation effects, denoted as kappa-squared (k^2). k^2 is defined as "the magnitude of the indirect effect relative to the maximum possible indirect effect" (Preacher and Kelley, 2011, p.27). This coefficient is independent of the scale of the variables and sample size and can convey the full meaning of an indirect effect (Preacher & Kelley, 2011). A parallel mediation model will be used to answer the secondary research question (PROCESS macro Model 4- 4 mediators; Hayes, 2013)

Academic Supervisor 1

Dr Azucena Guzman

Lecturer of Health and Aging

University of Edinburgh

Doorway 6, Old Medical School

Teviot Place

Edinburgh

EH8 9AG

Tel: +44 (0)131 651 5162

Email: Azucena.Guzman@ed.ac.uk

Clinical Supervisor 1

Prof Thanos Karatzias

Professor of Mental Health

Edinburgh Napier University

9 Sighthill Court

Edinburgh

EH11 4BN

Tel.:0131 455 5345

Email: T.Karatzias@napier.ac.uk

Clinical Supervisor 2

Mr Sandy McAfee

Consultant Clinical Psychologist

Psychology Department

St John's Hospital

Howden Road West

Livingston

EH54 6PP

Tel. 01506 523615

sandy.mcafee@nhslothian.scot.nhs.uk

References

Acierno, R., Ruggiero, K. J., Kilpatrick, D. G., Resnick, H. S. & Galea, S. (2006). Risk and protective factors for psychopathology among older versus younger adults after the 2004 Florida hurricanes. *Am J Geriatr Psychiatry*, *14*(12), 1051-1059. doi:10.1097/01.JGP.0000221327.97904.b0

Ahmadian, A., Mirzaee, J., Omidbeygi, M., Holsboer-Trachsler, E. & Brand, S. (2015). Differences in maladaptive schemas between patients suffering from chronic and acute posttraumatic stress disorder and healthy controls. *Neuropsychiatric Disease and Treatment*, *11*, 1677-1684. doi:10.2147/NDT.S85959

Alexander, M. S., Aaron, J. B. & Stephen, D. S. (2017). Determining Power and Sample Size for Simple and Complex Mediation Models. *Social Psychological and Personality Science*, *8*(4), 379-386. doi:10.1177/1948550617715068

Anilmis, J. V., Stewart, C. S., Roddy, S., Hassanali, N., Muccio, F., Browning, S., et al. (2015). Understanding the relationship between schematic beliefs, bullying, and unusual experiences in 8–14year olds. *European Psychiatry*, *30*(8), 920-923.

Averill, P. M. & Beck, J. G. (2000). Posttraumatic stress disorder in older adults: a conceptual review. *J Anxiety Disord*, *14*(2), 133-156.

Bernstein, D. P., Ahluvalia, T., Pogge, D. & Handelsman, L. (1997). Validity of the Childhood Trauma Questionnaire in an adolescent psychiatric population. *Journal of the American Academy of Child & Adolescent Psychiatry*, *36*(3), 340-348.

Bernstein, D. P. & Fink, L. (1998). *Childhood trauma questionnaire: A retrospective self-report: Manual*: Psychological Corporation.

Boscarino, J. A. (1995). Post-traumatic stress and associated disorders among Vietnam veterans: the significance of combat exposure and social support. *J Trauma Stress, 8*(2), 317-336.

Brewin, C. R., Andrews, B. & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *J Consult Clin Psychol, 68*(5), 748-766.

Calvete, E., Estévez, A. & Corral, S. (2007). Intimate partner violence and depressive symptoms in women: Cognitive schemas as moderators and mediators. *Behaviour Research and Therapy, 45*(4), 791-804. doi:http://dx.doi.org/10.1016/j.brat.2006.07.006

Carstensen, L. L., Fung, H. H. & Charles, S. T. (2003). Socioemotional selectivity theory and the regulation of emotion in the second half of life. *Motivation and emotion, 27*(2), 103-123.

Carstensen, L. L., Isaacowitz, D. M. & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American psychologist, 54*(3), 165.

Charles, S. T. & Carstensen, L. L. (2010). Social and emotional aging. *Annual review of psychology, 61*, 383-409.

Cloitre, M., Garvert, D. W., Brewin, C. R., Bryant, R. A. & Maercker, A. (2013). Evidence for proposed ICD-11 PTSD and complex PTSD: a latent profile analysis. *European Journal of Psychotraumatology; Vol 4 (2013) incl Supplements*.

Cloitre, M., Garvert, D. W., Weiss, B., Carlson, E. B. & Bryant, R. A. (2014). Distinguishing PTSD, Complex PTSD, and Borderline Personality Disorder: A latent class analysis. *European Journal of Psychotraumatology, 5*(1), 25097. doi:10.3402/ejpt.v5.25097

Cook, J. M. & Simiola, V. (2017). Trauma and PTSD in older adults: Prevalence, course, concomitants and clinical considerations. *Current Opinion in Psychology, 14*, 1-4.

Ehlers, A. & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*(4), 319-345. doi:http://dx.doi.org/10.1016/S0005-7967(99)00123-0

Elklit, A., Hyland, P. & Shevlin, M. (2014). Evidence of symptom profiles consistent with posttraumatic stress disorder and complex posttraumatic stress disorder in different trauma samples. *European Journal of Psychotraumatology, 5*, 10.3402/ejpt.v3405.24221. doi:10.3402/ejpt.v5.24221

Foa, E. B., Ehlers, A., Clark, D. M., Tolin, D. F. & Orsillo, S. M. (1999). The posttraumatic cognitions inventory (PTCI): Development and validation. *Psychological assessment, 11*(3), 303.

Fritz, M. S. & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological science, 18*(3), 233-239.

Fung, H. H., Carstensen, L. L. & Lang, F. R. (2001). Age-related patterns in social networks among European Americans and African Americans: Implications for socioemotional selectivity across the life span. *The International Journal of Aging and Human Development, 52*(3), 185-206.

Gianaros, P. J., Jennings, J. R., Sheu, L. K., Greer, P. J., Kuller, L. H. & Matthews, K. A. (2007). Prospective reports of chronic life stress predict decreased grey matter volume in the hippocampus. *NeuroImage, 35*(2), 795-803. doi:10.1016/j.neuroimage.2006.10.045

Goenjian, A. K., Najarian, L. M., Pynoos, R. S., Steinberg, A. M., Manoukian, G., Tavosian, A., et al. (1994). Posttraumatic stress disorder in elderly and younger adults after the

1988 earthquake in Armenia. *Am J Psychiatry, 151*(6), 895-901. doi:10.1176/ajp.151.6.895

Harding, H. G., Burns, E. E. & Jackson, J. L. (2012). Identification of Child Sexual Abuse Survivor Subgroups Based on Early Maladaptive Schemas: Implications for Understanding Differences in Posttraumatic Stress Disorder Symptom Severity. *Cognitive Therapy and Research, 36*(5), 560-575. doi:10.1007/s10608-011-9385-8

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*: Guilford Press.

Hsieh, S., McGrory, S., Leslie, F., Dawson, K., Ahmed, S., Butler, C. R., et al. (2015). The Mini-Addenbrooke's Cognitive Examination: a new assessment tool for dementia. *Dement Geriatr Cogn Disord, 39*(1-2), 1-11. doi:10.1159/000366040

Hyland, P., Shevlin, M., Elklit, A., Murphy, J., Vallières, F., Garvert, D. W., et al. (2017). An assessment of the construct validity of the ICD-11 proposal for complex posttraumatic stress disorder (Version 1) [doi:10.1037/tra0000114]. US: Educational Publishing Foundation.

Jayasinghe, N., Sparks, M. A., Kato, K., Wyka, K., Wilbur, K., Chiaramonte, G., et al. (2014). Posttraumatic stress symptoms in older adults hospitalized for fall injury(). *General hospital psychiatry, 36*(6), 669-673. doi:10.1016/j.genhosppsych.2014.08.003

Karatzias, T., Jowett, S., Begley, A. & Deas, S. (2016). Early maladaptive schemas in adult survivors of interpersonal trauma: foundations for a cognitive theory of psychopathology. *European Journal of Psychotraumatology, 7*(1), 30713. doi:10.3402/ejpt.v7.30713

Karatzias, T., Shevlin, M., Fyvie, C., Hyland, P., Efthymiadou, E., Wilson, D., et al. (2017). Evidence of distinct profiles of Posttraumatic Stress Disorder (PTSD) and Complex Posttraumatic Stress Disorder (CPTSD) based on the new ICD-11 Trauma Questionnaire (ICD-TQ). *J Affect Disord, 207*, 181-187. doi:10.1016/j.jad.2016.09.032

Knefel, M., Garvert, D. W., Cloitre, M. & Lueger-Schuster, B. (2015). Update to an evaluation of ICD-11 PTSD and complex PTSD criteria in a sample of adult survivors of childhood institutional abuse by Knefel & Lueger-Schuster (2013): a latent profile analysis. *European Journal of Psychotraumatology, 6*, 10.3402/ejpt.v3406.25290. doi:10.3402/ejpt.v6.25290

Lumley, M. N. & Harkness, K. L. (2007). Specificity in the Relations among Childhood Adversity, Early Maladaptive Schemas, and Symptom Profiles in Adolescent Depression. *Cognitive Therapy and Research, 31*(5), 639-657. doi:10.1007/s10608-006-9100-3

Maercker, A., Brewin, C. R., Bryant, R. A., Cloitre, M., van Ommeren, M., Jones, L. M., et al. (2013). Diagnosis and classification of disorders specifically associated with stress: proposals for ICD-11. *World Psychiatry, 12*(3), 198-206. doi:10.1002/wps.20057

Mather, M. & Carstensen, L. L. (2005). Aging and motivated cognition: the positivity effect in attention and memory. *Trends in Cognitive Sciences, 9*(10), 496-502. doi:10.1016/j.tics.2005.08.005

Moye, J. & Rouse, S. J. (2014). Posttraumatic Stress in Older Adults: When Medical Diagnoses or Treatments Cause Traumatic Stress. *Clinics in geriatric medicine, 30*(3), 577-589. doi:10.1016/j.cger.2014.04.006

Murphy, S., Elklit, A., Dokkedahl, S. & Shevlin, M. (2016). Testing the validity of the proposed ICD-11 PTSD and complex PTSD criteria using a sample from Northern

Uganda. *European Journal of Psychotraumatology, 7*(1), 32678. doi:10.3402/ejpt.v7.32678

Neupert, S. D., Almeida, D. M. & Charles, S. T. (2007). Age differences in reactivity to daily stressors: The role of personal control. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 62*(4), P216-P225.

Norris, F. H., Friedman, M. J., Watson, P. J., Byrne, C. M., Diaz, E. & Kaniasty, K. (2002). 60,000 Disaster Victims Speak: Part I. An Empirical Review of the Empirical Literature, 1981–2001. *Psychiatry: Interpersonal and Biological Processes, 65*(3), 207-239. doi:10.1521/psyc.65.3.207.20173

Oei, T. P. S. & Baranoff, J. (2007). Young Schema Questionnaire: Review of psychometric and measurement issues. *Australian Journal of Psychology, 59*(2), 78-86.

Ogle, C. M., Rubin, D. C. & Siegler, I. C. (2013). The impact of the developmental timing of trauma exposure on PTSD symptoms and psychosocial functioning among older adults. *Developmental Psychology, 49*(11), 2191-2200. doi:10.1037/a0031985

Op den Velde, W., Aarts, P. G. H., Falger, P. R. J., Hovens, J. E., Frey-Wouters, E., Van Duijn, H., et al. (1996). Prevalence and Course of Posttraumatic Stress Disorder in Dutch Veterans of the Civilian Resistance during World War II: An Overview. *Psychological Reports, 78*(2), 519-529. doi:10.2466/pr0.1996.78.2.519

Ozbay, F., Johnson, D. C., Dimoulas, E., Morgan, C. A., Charney, D. & Southwick, S. (2007). Social Support and Resilience to Stress: From Neurobiology to Clinical Practice. *Psychiatry (Edgmont), 4*(5), 35-40.

Parker, G., Lie, D., Siskind, D. J., Martin-Khan, M., Raphael, B., Crompton, D., et al. (2016). Mental health implications for older adults after natural disasters--a systematic review and meta-analysis. *Int Psychogeriatr, 28*(1), 11-20. doi:10.1017/s1041610215001210

Pauwels, E., Claes, L., Dierckx, E., Debast, I., Van Alphen, S. P., Rossi, G., et al. (2014). Age neutrality of the young schema questionnaire in patients with a substance use disorder. *Int Psychogeriatr, 26*(8), 1317-1326. doi:10.1017/s1041610214000519

Perkonigg, A., Höfler, M., Cloitre, M., Wittchen, H.-U., Trautmann, S. & Maercker, A. (2016). Evidence for two different ICD-11 posttraumatic stress disorders in a community sample of adolescents and young adults. *European Archives of Psychiatry and Clinical Neuroscience, 266*(4), 317-328. doi:10.1007/s00406-015-0639-4

Perkonigg, A., Kessler, R. C., Storz, S. & Wittchen, H. U. (2000). Traumatic events and post-traumatic stress disorder in the community: prevalence, risk factors and comorbidity. *Acta Psychiatr Scand, 101*(1), 46-59.

Preacher, K. J. & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior research methods, 36*(4), 717-731.

Preacher, K. J. & Kelley, K. (2011). Effect size measures for mediation models: quantitative strategies for communicating indirect effects. *Psychological methods, 16*(2), 93.

Price, J. P. (2007). Cognitive schemas, defence mechanisms and post- traumatic stress symptomatology. *Psychology and Psychotherapy: Theory, Research and Practice, 80*(3), 343-353.

Ross, C. E. & Van Willigen, M. (1997). Education and the Subjective Quality of Life. *Journal of Health and Social Behavior, 38*(3), 275-297. doi:10.2307/2955371

Scher, C. D., Stein, M. B., Asmundson, G. J., McCreary, D. R. & Forde, D. R. (2001). The childhood trauma questionnaire in a community sample: psychometric properties and normative data. *J Trauma Stress, 14*(4), 843-857. doi:10.1023/a:1013058625719

Solomon, Z., Helvitz, H. & Zerach, G. (2009). Subjective age, PTSD and physical health among war veterans. *Aging and Mental Health, 13*(3), 405-413.

Southwick, S. M., Vythilingam, M. & Charney, D. S. (2005). The psychobiology of depression and resilience to stress: implications for prevention and treatment. *Annu Rev Clin Psychol, 1*, 255-291. doi:10.1146/annurev.clinpsy.1.102803.143948

van Zelst, W. H., de Beurs, E., Beekman, A. T. F., van Dyck, R. & Deeg, D. D. H. (2006). Well- being, physical functioning, and use of health services in the elderly with PTSD and sub-threshold PTSD. *International Journal of Geriatric Psychiatry, 21*(2), 180-188.

Wright, M. O. D., Crawford, E. & Del Castillo, D. (2009). Childhood emotional maltreatment and later psychological distress among college students: The mediating role of maladaptive schemas. *Child Abuse & Neglect, 33*(1), 59-68. doi:http://dx.doi.org/10.1016/j.chiabu.2008.12.007

Yehuda, R., Flory, J. D., Southwick, S. & Charney, D. S. (2006). Developing an Agenda for Translational Studies of Resilience and Vulnerability Following Trauma Exposure. *Annals of the New York Academy of Sciences, 1071*(1), 379-396. doi:10.1196/annals.1364.028

Young, J. E., Klosko, J. S. & Weishaar, M. E. (2003). *Schema therapy: A practitioner's guide*: Guilford Press.

Young, J.E (2014). *Young Schema Questionnaire-3.* New York: Cognitive Therapy Center.

Appendix J: Empirical Research documents: Participant Information Sheet

Participant Information Sheet

We would like to invite you to take part in a thesis research project being carried out by The University of Edinburgh and NHS Lothian.

Before you decide if you would like to take part it is important for you to understand why the research is being done and what it will involve.

Please take time to read the following information carefully, if you are interested in taking part there will be an opportunity to discuss the research further before you make a decision.

- **What is the purpose of this study?**

The purpose of the study is to help us understand of the relationship between difficult and/or traumatic events in childhood and psychological distress. Traumatic experiences are defined as witnessing or experiencing an event which includes the threat of death, injury, or assault to yourself or others. Examples of this may be having experienced or witnessed abuse or neglect.

Specifically, this study will examine whether sets of memories, emotions and thoughts regarding oneself and the world can explain the relationship between childhood traumatic events and psychological distress.

- **Why have I been asked to take part?**

We are asking adults older than 64 years who have experienced childhood traumatic events if they wish to be considered to be included in the study. If you wish to take part a meeting will be arranged where you can ask questions. It is possible that at this meeting it is decided that the study is not suitable for you at this time.

- **Do I have to take part?**

No, participating in this study is entirely voluntary. If you decide to take part you are still free to withdraw at any time and without giving a reason. Deciding not to take part or withdrawing from the study will not affect the healthcare that you receive.

- **What do I have to do to participate?**

If you are interested in taking part, please either contact us directly on the number provided below or let your clinician know. Your clinician will ask you if you would like to be contacted by the researcher with further information on the study. If you agree, your clinician will pass on your contact details to the researcher. The researcher will then call you to provide you with more information and answer any questions. If you are willing to participate, a meeting will be arranged. At this meeting you will have the opportunity to ask

questions about the study and make a decision about whether or not to be involved. You can still change your mind at any time.

During the meeting, you will be asked to complete four questionnaires with the assistance of a researcher. The appointment is likely to last approximately one hour. You will be able to have a break if necessary.

- **Where will the meeting take place?**

The meeting will take place at NHS premises but we will try and be flexible as to the time, date and venue of the appointment to accommodate your needs. The option of a home visit may also be available upon discussion with the researcher.

- **Who will be notified of my participation?**

Your GP will be made aware of your participation in the study (but not of any of your answers), as recommended by The NHS Health Research Authority. In order to do this, you will be asked to provide your name, address, D.O.B and GP details in a separate form. This information will only be used to make contact with your GP.

- **What are the possible disadvantages of taking part?**

We do not anticipate that you will experience any disadvantages from taking part in this study. However, some of the questions inquire about past traumatic experiences and you may find these questions intrusive. Therefore, in completing these questionnaires, there is a possibility that you may become distressed by the content of the questions. If this situation arises, one of the researchers will be available for a follow-up conversation to offer you support. Information on appropriate mental health support is also provided on page 4 of this information sheet.

- **What are the possible benefits of taking part**?

No benefits for potential participants have been identified but you may derive some satisfaction from contributing to research which helps us better understand the link between childhood stressful experiences and psychological distress.

- **How will my privacy be protected?**

This study will be confidential. Your name will not appear in any published research. The data will use unique identifiers only. A code will be placed on the questionnaires you complete and your name will be kept separately in a locked filing cabinet. Only the researchers will have access to these. The personal answers you give will not be shared with anyone else, including your GP.

However, if we believed there was a risk of harm to yourself or others we would share this information with others. If that is the case, we would share this information with your GP and relevant authorities, which may include police or social services. In this situation, you would be informed and we would alert your GP so they could support you.

- **Where will my data be stored?**

All data will be stored in locked filing cabinets to which only the researchers will have access. At the end of the study anonymous data will be stored electronically by the University

of Edinburgh. Personal data will be stored for 6 – 12 months and anonymised research data will be stored for 5 years. It is possible that the anonymised data will be used for further research in the future.

- **What will happen to the results of the research study?**

It is the intention of the researchers to submit the results of this study for publication in a peer-reviewed journal. The findings of the study will be also published as a university thesis and may be included in academic conferences. No identifiable information will be included in publications and it will not be possible to link you to the study data in any way.

- **Will I receive a copy of the results?**

A report of the findings can be made available to you after the end of the research if you wish. You can also find out further information by contacting us on the number provided below.

- **Who is organising the research?**

This study is being organised/sponsored and funded by The University of Edinburgh.

- **Who has reviewed the study?**

The study proposal has been reviewed by The University of Edinburgh and NHS Lothian. All research in the NHS is looked at by an independent group of people, called a Research Ethics Committee. A favorable ethical opinion has been obtained by the North of Scotland Research Ethics Committee. NHS Management approval has also been given.

Support resources and available services.

Breathing Space 0800 83 85 87
The Samaritans 08457 90 90 90
You can also visit the website below for additional support and advice:
NHS Choices: Post-traumatic stress disorder (PTSD) - Complex PTSD
http://www.nhs.uk/Conditions/Post-traumatic-stress-disorder/Pages/Complex.aspx

You are welcome to contact us to ask questions about the research and share any considerations.

Contact information:
Eleni Vasilopoulou

Trainee Clinical Psychologist
Psychology Department
2nd Floor MacKinnon House
Royal Edinburgh Hospital
Edinburgh
EH10 5HF
If you would like to discuss this study with someone independent of the study team please contact: Dr Angus Macbeth on (0)131 650 3893 or email: angus.macbeth@ed.ac.uk

If you wish to make a complaint about the study please contact:

NHS Lothian Complaints Team
2nd Floor, Waverley Gate,
2-4 Waterloo Place
Edinburgh
EH1 3EG
Tel: 0131 536 3370
Email: feedback@nhslothian.scot.nhs.uk

NHS Fife Patient Relations
Room 104, Hayfield House, Hayfield Road
Kirkcaldy
KY2 5AH

Tel: 01592 648153 Ext: 28153
Email: patientrelations.fife@nhs.net

NHS Lanarkshire Patient Affairs
Laura Jack, Patient Affairs Manager
NHS Lanarkshire Headquarters
Kirklands, Fallside Road, Bothwell. G71 8BB
Tel: 01698 858321
Email: PatientAffairs.Primarycare@lanarkshire.scot.nhs.uk

NHS Forth Valley Patient Relations and Complaints Service
Forth Valley Royal Hospital
Stirling Road, Larbert
FK5 4WR
Tel.: 01324 566660
Email: fv-uhb.complaints@nhs.net

Thank you very much for reading this information sheet.

Appendix K: Empirical Research documents: Clinician Information sheet

THE UNIVERSITY of EDINBURGH

NHS Lothian

Clinician Information Sheet

The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years): A mediation analysis.

What is the research about?

We are interested in the relationship between childhood traumatic events, Early Maladaptive Schemas (EMS) and Complex Posttraumatic Stress Disorder (CPTSD) symptoms among older adults (>64 years). Specifically, we are interested in examining whether EMS mediate the relationship between childhood traumatic events and CPTSD symptom severity.

Why is the research being carried out?

Complex Posttraumatic Stress Disorder (CPTSD) has been proposed for inclusion in the ICD-11 as a sibling condition to Posttraumatic Stress Disorder (PTSD). CPTSD is viewed as a result of exposure to cumulative trauma, particularly in childhood. In addition to PTSD symptoms (re-experiencing, avoidance/numbing, and hyperarousal/hypervigilance), CPTSD also includes symptom clusters that highlight self-organization disturbances (affective dysregulation, negative self-concept and disturbances in relationships). Early Maladaptive Schema (EMS) have been shown to be significant predictors of PTSD in adults who have experienced traumatic events. However, to our knowledge no studies have investigated the role of EMS in the development of CPTSD within the older adult population.

Who is being asked to take part?

Inclusion criteria: Older adults (>64) with a history of childhood trauma (physical abuse, sexual abuse, emotional abuse, physical neglect, emotional neglect) will be eligible for participation. In order to participate in the study service users would need to be willing to participate voluntarily and to be able to give written informed consent.

Exclusion criteria: Older adults who lack fluency in English will be excluded. Older adults in crisis, experiencing suicidal thoughts with clear intent to harm themselves will also be excluded from this study. The study will exclude individuals who lack capacity to consent to research. Older adults who present with a diagnosis of Mild Cognitive Impairment (MCI) or Dementia will also be excluded from the study as this may influence the accuracy of the findings.

What are the possible benefits of taking part?

No benefits for potential participants have been identified.

What are the possible disadvantages of taking part?

There is no evidence to suggest that asking people about trauma results in any serious or long-lasting harm. It is possible however that participants might find some of the questionnaire topics distressing. A care protocol has been developed outlining the steps that will be taken to manage any participant distress. Copies of the care protocol are available from the main researcher at request.

What am I being asked to do?

The researcher would be grateful if you could review your current caseload and identify any patients that may meet inclusion and exclusion criteria for the current study. Individuals at any stage of therapy can participate. During your routine contact with your patient, the researcher would request that you discuss the current study with them and issue them with a copy of the Information Sheet. If your patient expresses an interest in the current study, the researcher requests that you ask for their permission for the researcher to contact them to provide further information regarding the study. You will then be asked to contact the researcher via telephone with the potential participant's details.

Procedure

Potential participants will have at least 24 hours to consider the Participant Information sheet. The researcher will then telephone potential participants to provide them with further information about the study, answer any questions and establish whether they meet inclusion criteria. The researcher will send a further Participant Information sheet if required. If potential participants remain interested in taking part in the study, the researcher will arrange a meeting during which participants will sign the consent forms. Following this, participantsbe asked to complete a demographic questionnaire as well as the following study measures, lasting in total approximately 55 minutes: Young Schema Questionnaire – Short Form, 3rd Edition; ICD 11 Trauma Questionnaire-Version 1.2; Childhood Trauma Questionnaire.

Who is doing this research?

The main researcher (Eleni Vasilopoulou) is a Trainee Clinical Psychologist based in NHS Lothian. This study a thesis project, part of the Doctorate in Clinical Psychology Programme training at the University of Edinburgh. The study is being supervised by Dr Azucena Guzman (Lecturer, University of Edinburgh), Prof Thanos Karatzias and Mr Sandy McAfee (Consultant Clinical Psychologists).

You can contact the main researcher at eleni.vasilopoulou@nhslothian.scot.nhs.uk to obtain more information or to discuss whether a patient may be suitable for the study. If you would like to hear independent advice on this research project, please contact Dr Angus Macbeth at angus.macbeth@ed.ac.uk

Thank you for taking the time to read this information sheet.

Appendix L: Empirical Research documents: Consent form

NHS Lothian

Participant Consent Form

Study Title: The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years): A mediation analysis.

Participant ID: _____

Name of Researchers: Eleni Vasilopoulou. Supervisors: Azucena Guzman, Thanos Karatzias, Sandy McAfee

	Please initial
I confirm that I have read and understood the information sheet for the above study (Version ___. Date_____) and have had the opportunity to consider the information and ask questions.	
I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason, without my medical care or legal rights being affected.	
I understand that non-identifiable data may be transferred from the research site to the university.	
I understand that the findings of this study will be submitted for publication.	
I understand that my GP will be notified of my participation, using the contact details I have provided to the study team for this purpose and that additional information may be supplied to my GP if cognitive difficulties or disclosures are revealed to the researcher during the study.	
I understand that relevant sections of my medical notes and data collected during the study may be looked at by individuals from the regulatory authorities and from the Sponsors (NHS Lothian and the University of Edinburgh) or from the/other NHS Board(s) where it is relevant to my taking part in this research. I give permission for those individuals to have access to my records"	
I agree for anonymised data from this study to be used in future ethically approved research.	
I agree to take part in the above study.	

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Name of Person taking consent	Date	Signature

Appendix M: Empirical Research documents: Debriefing form

THE UNIVERSITY of EDINBURGH

NHS Lothian

Debriefing Form

The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years): A mediation analysis.

Thank you for participating in the above study. The information gathered from this study will help us better understand the relationship between traumatic experiences and distress in older adults. This may inform new ways of identifying and responding to people who have experienced trauma.

The final results and conclusions of the study will be published as a university thesis in March 2019. They will also be shared through conferences and peer reviewed scientific journals. No identifiable information will be included in any publication.

We are happy to provide you with a summary of the results of the study if you provide your contact details below. Please also keep a copy of this form for yourself.

If you wish to receive a summary of the results of this research when they are published please provide your contact details:

Name: Address:

If you wish to make a complaint about the study please contact:
NHS Lothian Complaints Team
2nd Floor, Waverley Gate, 2-4 Waterloo Place
Edinburgh
EH1 3EG
Tel: 0131 536 3370
Email: feedback@nhslothian.scot.nhs.uk

It is not thought that participating in this study results in any serious or long term psychological harm. However, the topics covered by this study can be difficult to talk or think about. If taking part in this study causes you distress, the researcher would recommend that at first instance you seek support from your GP or clinician. If you feel that would like additional support, please see the details of organisations below that may be able to help:

Breathing Space
Breathing Space is a free and confidential phone service that provides support during times of difficulty. They aim to provide a safe and supportive place through listening, offering advice and providing information.
Telephone: 0800 838 587
Website: www.breathingspace.scot

The Samaritans
The Samaritans provides a free, confidential phone service that aims to create a place for people to talk through their problems, explore their options and find a way through their current difficulties.
Telephone: 116 123
Website: www.thesamaritans.org

National Association for People Abused in Childhood (NAPAC)
NAPAC supports both men and women who have experienced any form of abuse in childhood.
Telephone: 0808 801 0331
Website: www.napac.org.uk

The National Society for the Prevention of Cruelty to Children (NSPCC)
The NSPCC is a charity that works to prevent child abuse and to support individuals who have experienced abuse as children. There is a section on their website about Non-recent abuse for adults who experienced abuse as children
Website: www.nspcc.org.uk

NHS Choices: Post-traumatic stress disorder (PTSD) - Complex PTSD
You can also visit the website below for additional support and advice:
www.nhs.uk/Conditions/Post-traumatic-stress-disorder

Appendix N: Empirical Project: Summary of Results for Participants (Adapted from Research Proposal)

THE UNIVERSITY of EDINBURGH

NHS SCOTLAND

Dear Participant,

Thank you very much for offering your time and energy to take part in our research project with title: The mediating role of early maladaptive schemas in the relationship between childhood traumatic events and complex posttraumatic stress disorder symptoms in older adults.

As agreed, we have enclosed a lay summary of our results, which we hope will be of interest to you.

It was very nice to meet you and I wish you all the best for the future.

Yours sincerely,

Eleni Vasilopoulou

Trainee Clinical Psychologist

Lothian Older People's Psychology Service

THE UNIVERSITY of EDINBURGH

NHS SCOTLAND

Lay Summary of Study

Complex Posttraumatic Stress disorder (CPTSD) is a term used to describe a variety of difficulties that people experience as a result of long-term exposure to childhood traumatic events. Such difficulties may include re-experiencing the traumatic event as if it was happening in the present, avoiding reminders of the traumatic events as well as a persistent sense of threat. People with CPTSD may also experience difficulties in managing their emotions, problems in relationships and a negative view of themselves.

Exposure to traumatic events is not always enough to explain the development of CPTSD symptoms. In fact, the majority of people who experience traumatic events do not go on to develop post-traumatic symptoms. Thus, previous research has sought to investigate which factors make people more likely to develop such symptoms. Research in adults has identified Early Maladaptive Schemas (EMS) as a risk factor which makes people more vulnerable to develop post-traumatic symptoms. EMS are sets of memories, emotions and thoughts regarding oneself, the world and one's relationship with others. Examples of EMS may include cognitions such as "I don't fit in" or "I am a good person because I think of others more than myself".

Although EMS have been shown to make adults more prone to developing post-traumatic symptoms, we have no knowledge of whether this is also true for older adults (age 64+ years). However, we do know that adaptation to trauma may be different across different age groups. For example, specific circumstances such as reduced social support, health difficulties, or loss of a loved one might make coping with early trauma more difficult for older adults.

The current study examined whether EMS can explain the relationship between early traumatic events and CPTSD symptoms in a sample of older adults who currently use NHS Mental Health services in Scotland. In addition, the study investigated whether specific types of schema make survivors of childhood trauma more likely to experience CPTSD symptoms. Forty-two participants with a history of childhood trauma who were able to consent to research and had no diagnosis of MCI or dementia were included in this study. Participants completed three measures assessing childhood trauma, EMS and CPTSD symptoms, along with a demographic questionnaire.

Our results showed that participants who had experienced greater degree of trauma in childhood were more likely to report high EMS. In addition, the degree of EMS that participants held impacted on their level of symptoms: Participants scoring higher on EMS suffered more CPTSD symptoms. Two schema categories, Disconnection and Impaired Autonomy were specifically linked to CPTSD symptom severity. Disconnection schemas include beliefs around others being emotionally unresponsive, hurtful, or manipulative. Impaired Autonomy includes beliefs around others being unreliable, and around one's self being dependent and vulnerable to harm. Participants reporting more Disconnection and Impaired Autonomy EMS were more likely to experience CPTSD symptoms.

Our results suggest that challenging schemas, especially those around Disconnection and Impaired Autonomy, could help reduce CPTSD symptom severity in older adults. These results can inform clinical assessment and may support the development of old age specific trauma interventions in order to promote positive outcomes for this population.

Appendix O: Systematic Review: Prospero registration

Factors associated with the severity of Post-Traumatic Stress Disorder and Complex Post-Traumatic Stress Disorder in older adults: a systematic review

Eleni Vasilopoulou, Azucena Guzman, Thanos Karatzias, Beata Michalska da Rocha

Citation

Eleni Vasilopoulou, Azucena Guzman, Thanos Karatzias, Beata Michalska da Rocha. Factors associated with the severity of Post-Traumatic Stress Disorder and Complex Post-Traumatic Stress Disorder in older adults: a systematic review. PROSPERO 2018 CRD42018092891 Available from: http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42018092891

Review question

What are the factors associated with Post Traumatic Stress Disorder and Complex Post Traumatic Stress Disorder symptom severity among older adults?

Specifically, our review will seek to answer the following research questions:

1. What are the pre-trauma factors associated with Post Traumatic Stress Disorder and Complex Post Traumatic Stress Disorder symptom severity among older adults?

2. What are the peri-trauma factors associated with Post Traumatic Stress Disorder and Complex Post Traumatic Stress Disorder symptom severity among older adults?

3. What are the post-trauma factors associated with Post Traumatic Stress Disorder and Complex Post Traumatic Stress Disorder symptom severity among older adults?

Searches

An initial search of the Cochrane Database of Systematic Reviews (CDSR) and the Database of Abstracts of Reviews of Effects (DARE) was performed to ensure the absence of similar reviews. Following this, a systematic database search was conducted in February 2018 to identify relevant studies. Databases containing unpublished material were also included. The following databases were included in the search: MEDLINE, PsycINFO, Embase, CINAHL, ASSIA, PILOTS and Sociological Abstracts. PROQUEST Dissertation and Thesis Global was used to identify unpublished literature. A combination of different keyword searches were entered in each database. Broader terms were preferred due to the relative dearth of empirical research on this topic. The keywords referring to PTSD and CPTSD were “Post traumatic*”, “Posttraumatic*”, “Complex post trauma*” and “Complex posttrauma*”. These were combined with the keywords “older adult*”, “older people”, “geriatric”, “old age”, “aged” and “elderly”. A combination of index and MeSH terms were used according to the requirements of each database. Language (English) and publication date restrictions (later than 1980) were imposed. The searches will be re-run just before the final analyses and further studies may be retrieved for inclusion. Reference lists of relevant articles will also be reviewed.

Types of study to be included

We will include cross-sectional studies, correlational studies, cohort studies, case-control studies, prospective studies and longitudinal studies.

Condition or domain being studied

Post-traumatic stress disorder (PTSD) and Complex Post-Traumatic Stress Disorder (CPTSD) (Maercker et al., 2013) in Older Adults.

According to the forthcoming 11th version of the International Classification of Diseases (ICD-11), PTSD comprises three symptom clusters: re-experiencing in the here and now; deliberate avoidance; and sense of current threat. CPTSD has been proposed for inclusion in the ICD-11 as a sibling condition to Posttraumatic Stress Disorder (PTSD). In addition to the three PTSD symptom clusters, CPTSD also includes symptom clusters that highlight disturbances in self-organization (affective dysregulation, negative self-concept and disturbances in relationships). In contrast to PTSD which can be triggered by a single event, CPTSD is viewed as a result of repeated and prolonged exposure to trauma, particularly in childhood (Maercker et al., 2013).

Factors associated with the severity of post-traumatic psychopathology in adults can be divided into three main categories: pre-trauma, peri-trauma and post-trauma factors. Pre-trauma factors can include age, gender, race/ethnicity, cognitive ability, socio-economic status and neurobiological factors (Brewin et al., 2000; DiGangi et al., 2013; Feder et al., 2009; Yehuda & Flory Janine, 2007). Examples of peri-trauma factors may include trauma severity, trauma duration and type of trauma exposure (Ozer et al., 2003). Post-trauma factors can include additional life stress, social and family support, coping strategies, cognitive schemas and physical health (Johnson & Thompson, 2008; Karatzias et al., 2016; Udwin et al., 2000).

This review aims to systematically examine and analyse studies within the older adult population investigating the association between PTSD or CPTSD severity and (a) pre-trauma factors (b) peri-trauma factors or (c) post-trauma factors.

References:

Brewin, C. R., Andrews, B. & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. J Consult Clin Psychol, 68(5), 748-766.

DiGangi, J. A., Gomez, D., Mendoza, L., Jason, L. A., Keys, C. B. & Koenen, K. C. (2013). Pretrauma risk factors for posttraumatic stress disorder: A systematic review of the literature. Clinical Psychology Review, 33(6), 728-744. doi:https://doi.org/10.1016/j.cpr.2013.05.002

Feder, A., Nestler, E. J. & Charney, D. S. (2009). Psychobiology and molecular genetics of resilience. Nat Rev Neurosci, 10(6), 446-457. doi:10.1038/nrn2649

Johnson, H. & Thompson, A. (2008). The development and maintenance of post-traumatic stress disorder (PTSD) in civilian adult survivors of war trauma and torture: A review. Clinical Psychology Review, 28(1), 36-47. doi:https://doi.org/10.1016/j.cpr.2007.01.017

Karatzias, Jowett, S., Begley, A. & Deas, S. (2016). Early maladaptive schemas in adult survivors of interpersonal trauma: foundations for a cognitive theory of psychopathology. European Journal of Psychotraumatology, 7(1), 30713. doi:10.3402/ejpt.v7.30713

Maercker, A., Brewin, C. R., Bryant, R. A., Cloitre, M., van Ommeren, M., Jones, L. M., et al. (2013). Diagnosis and classification of disorders specifically associated with stress: proposals for ICD-11. World Psychiatry, 12(3), 198-206. doi:10.1002/wps.20057

Ozer, E. J., Best, S. R., Lipsey, T. L. & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: a meta-analysis. Psychological bulletin, 129(1), 52.

Udwin, O., Boyle, S., Yule, W., Bolton, D. & O'Ryan, D. (2000). Risk Factors for Long-term Psychological Effects of a Disaster Experienced in Adolescence: Predictors of Post Traumatic Stress Disorder. The Journal of Child Psychology and Psychiatry and Allied Disciplines, 41(8), 969-979. doi:undefined

Yehuda, R. & Flory Janine, D. (2007). Differentiating biological correlates of risk, PTSD, and resilience following trauma exposure. Journal of Traumatic Stress, 20(4), 435-447. doi:10.1002/jts.20260

Participants/population

Inclusion: Older Adults (age>59 years) exposed to either single event or cumulative trauma and experiencing PTSD or CPTSD symptoms. Exclusion: Younger adults (59 years and below). Non-traumatised individuals.

Intervention(s), exposure(s)

Not applicable.

Comparator(s)/control

We will include studies where people with PTSD or CPTSD are compared to healthy individuals, and studies comparing groups differing on PTSD/CPTSD severity.

Context

The present review will include quantitative studies based on the following inclusion and exclusion criteria: (a) Studies will have to include participants exposed to either single event trauma or cumulative trauma, as per PTSD diagnostic criterion A (American Psychiatric Association, 2013); (b) Studies will be considered for inclusion if at least 50% of their sample comprises of adults older than 59 years; (c) Studies will have to use PTSD or CPTSD questionnaires to measure post-traumatic severity; (d) Studies reporting continuous data and diagnostic status will both be included. (e) Studies that examine the interaction of PTSD/CPTSD with pre-, peri- or post-trauma related factors will be included; (f) Studies utilising a between groups design comparing groups differing on PTSD/CPTSD diagnostic status or severity will also be included; (g) Research addressing the impact of interventions on trauma symptoms will be excluded as it has a different focus; (h) The search will be limited to studies published in English due to the lack of translation resources; (i) The search will also be limited to studies conducted after 1980, when PTSD was first codified as a disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM), Third Edition (DSM-III) (American Psychiatric Association, 1981)

Main outcome(s)

Posttraumatic Stress Disorder (PTSD) and Complex Posttraumatic Stress Disorder (CPTSD) mean scores on a validated scale. PTSD and CPTSD measures should examine symptom clusters in line with the following diagnostic manuals: (a) For PTSD: DSM-IV, DSM-5, International Classification of Diseases version 10 (ICD-10) or ICD-11; (b) For CPTSD: ICD-11 proposed criteria.

Additional outcome(s)

None.

Data extraction (selection and coding)

Title and/or abstract screening will be independently conducted by the first and last review authors. The first and last authors would then independently assess the full text of these potentially eligible studies for eligibility. Deviating evaluations will be discussed in order for a consensus rating to be obtained. Any disagreement will be resolved through discussion with a third author.

Details from eligible studies will be extracted using a pre-designed data extraction form. The following data will be extracted: (a) Study design (b) Total number of participants (c) Type of trauma exposure; (d) Associated Factors measured; (e) Participant characteristics, such as age, gender, employment status, PTSD/CPTSD diagnosis and comorbidity; (f) Participant inclusion and exclusion criteria; (g) Information on the measures used; (h) Data collection process; (i) Data analysis procedure; (j) Main findings and (k) Conflict of interest/source of funding. When data are missing or unclear, further information will be sought from the study authors. Cohen's Kappa coefficient will be calculated to provide an estimate of inter-rater reliability. Two review authors will extract data independently. Discrepancies will be identified and resolved through discussion (with a third author where necessary).

Risk of bias (quality) assessment

A quality appraisal checklist was created in order to evaluate the quality of the reviewed studies and assess risk of bias. This was created based on the 'STROBE Statement: Checklist of items that should be included in reports of cross-sectional studies'(Von Elm et al., 2014) and other published tools (McLean et al., 2008; Scottish Intercollegiate Guidelines Network, 2012). Quality factors included background information, participant selection, assessment and measures, statistical analysis and generalisability of findings. All studies will be rated independently by the first and last authors of this review. Cohen's Kappa coefficient will be calculated to assess inter-rater reliability. Deviating evaluations will be discussed in order for a consensus rating to be obtained. Further discrepancies will be addressed with the involvement of a third review author where necessary. The following characteristics will be considered in the Quality Appraisal:

BACKGROUND: The study addresses an appropriate and clearly focused question.

SELECTION OF SUBJECTS: Sample is clearly defined and the methods of selection are stated; Exclusion and Inclusion criteria are listed; Cases are clearly defined and differentiated from controls (if applicable); The study reports how the sample size was reached and provides power calculations; Sample size is adequate to answer the research question.

ASSESSMENT: The study uses a robust measure of PTSD/CPTSD; The study uses a robust measure for each associated factor

STATISTICAL ANALYSIS: The study explains analytic methods for all outcome analyses; The study explains how missing data were handled in the analysis; The analyses are appropriate to answer the research question(s).

RESULTS: The study describes demographic characteristics and all variables of prognostic importance; The study provides confidence intervals for prevalence estimates and P values for any major group comparisons; The study reports an adequate response rate (>50%).

DISCUSSION: The study discusses biases and limitations; The study states conflict of interest and/or source of funding.

References:

McLean, J., Maxwell, M., Platt, S., Harris, F. M. & Jepson, R. (2008). Risk and protective factors for suicide and suicidal behaviour: A literature review: Scottish Government.

Scottish Intercollegiate Guidelines Network. (2012). Methodology Checklist 4: Case-control studies. Retrieved from http://www.sign.ac.uk/methodology/checklists.html

Von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., Vandenbroucke, J. P., et al. (2014). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies. International Journal of Surgery, 12(12), 1495-1499.

Strategy for data synthesis

We will provide a narrative synthesis of the findings from the included studies, structured around the type of factor measured e.g. pre-trauma, peri-trauma or post-trauma factor. We anticipate that there will be limited scope for meta-analysis because of the range of different outcomes measured across the small number of existing studies.

Analysis of subgroups or subsets

While subgroup analyses may be undertaken it is not possible to specify the groups in advance.

Contact details for further information

Eleni Vasilopoulou

s1056337@sms.ed.ac.uk

Organisational affiliation of the review

University of Edinburgh/ NHS Lothian

https://www.ed.ac.uk/

Review team members and their organisational affiliations

Ms Eleni Vasilopoulou. University of Edinburgh/ NHS LothianDr Azucena Guzman. University of EdinburghProfessor Thanos Karatzias. Edinburgh Napier University/Rivers Centre for Traumatic StressDr Beata Michalska da Rocha. NHS Lothian

Anticipated or actual start date

23 January 2018

Anticipated completion date

01 August 2018

Funding sources/sponsors

NHS Lothian/ University of Edinburgh

Conflicts of interest

Language

English

Country

Scotland

Stage of review

Review_Ongoing

Subject index terms status

Subject indexing assigned by CRD

Subject index terms

Adult; Humans; Stress Disorders, Post-Traumatic

Date of registration in PROSPERO

10 April 2018

Date of publication of this version

10 April 2018

Details of any existing review of the same topic by the same authors

Stage of review at time of this submission

Stage	Started	Completed
Preliminary searches	Yes	No
Piloting of the study selection process	Yes	No
Formal screening of search results against eligibility criteria	Yes	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

Versions

10 April 2018

Appendix P: Systematic Review: Changes in protocol

The following changes were made:

1. Kate Forsyth, Assistant Psychologist was added to the research team to assist with the data extraction procedure. In regard to the quality appraisal, as previously noted, all studies were independently by the first author and Dr Beata Michalska.
2. The Systematic Review exclusively focused on published research.
3. The Systematic Review did not address pre- and peri- trauma factors.
4. Studies were rated as 'High Quality', 'Good Quality' or 'Low Quality' according to published guidelines (Harrison, Reid, Quinn & Shenkin, 2016)
5. The completion date of the review was extended to January 2019.

Harrison, J. K., Reid, J., Quinn, T. J., & Shenkin, S. D. (2016). Using quality assessment tools to critically appraise ageing research: a guide for clinicians. *Age and ageing*, 46(3), 359–365. doi:10.1093/ageing/afw223

Appendix Q: Systematic Review: Clinical Psychology Review: Guide for authors

Guide for Authors

Submission checklist

You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:
• E-mail address
• Full postal address

All necessary files have been uploaded:
Manuscript:
• Include keywords
• All figures (include relevant captions)
• All tables (including titles, description, footnotes)
• Ensure all figure and table citations in the text match the files provided
• Indicate clearly if color should be used for any figures in print
Graphical Abstracts / Highlights files (where applicable)
Supplemental files (where applicable)

Further considerations
• Manuscript has been 'spell checked' and 'grammar checked'
• All references mentioned in the Reference List are cited in the text, and vice versa
• Permission has been obtained for use of copyrighted material from other sources (including the Internet)
• A competing interests statement is provided, even if the authors have no competing interests to declare
• Journal policies detailed in this guide have been reviewed
• Referee suggestions and contact details provided, based on journal requirements

For further information, visit our Support Center.

Before You Begin

Ethics in publishing

Please see our information pages on Ethics in publishing and Ethical guidelines for journal publication.

Declaration of interest

All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests

include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file (if double-blind) or the manuscript file (if single-blind). If there are no interests to declare then please state this: 'Declarations of interest: none'. This summary statement will be ultimately published if the article is accepted. 2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal's official records. It is important for potential interests to be declared in both places and that the information matches. More information.

Submission declaration and verification

Submission of an article implies that the work described has not been published previously (except in the form of an abstract, a published lecture or academic thesis, see 'Multiple, redundant or concurrent publication' for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. To verify originality, your article may be checked by the originality detection service Crossref Similarity Check.

Preprints

Please note that preprints can be shared anywhere at any time, in line with Elsevier's sharing policy. Sharing your preprints e.g. on a preprint server will not count as prior publication (see 'Multiple, redundant or concurrent publication' for more information).

Use of inclusive language

Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Articles should make no assumptions about the beliefs or commitments of any reader, should contain nothing which might imply that one individual is superior to another on the grounds of race, sex, culture or any other characteristic, and should use inclusive language throughout. Authors should ensure that writing is free from bias, for instance by using 'he or she', 'his/her' instead of 'he' or 'his', and by making use of job titles that are free of stereotyping (e.g. 'chairperson' instead of 'chairman' and 'flight attendant' instead of 'stewardess').

Changes to authorship

Authors are expected to consider carefully the list and order of authors **before**submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only **before** the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the **corresponding author**: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed.

Only in exceptional circumstances will the Editor consider the addition, deletion or rearrangement of authors **after** the manuscript has been accepted. While the Editor considers the request, publication

of the manuscript will be suspended. If the manuscript has already been published in an online issue, any requests approved by the Editor will result in a corrigendum.

Author Disclosure Policy

Authors must provide three mandatory and one optional author disclosure statements. These statements should be submitted as one separate document and not included as part of the manuscript. Author disclosures will be automatically incorporated into the PDF builder of the online submission system. They will appear in the journal article if the manuscript is accepted.

The four statements of the author disclosure document are described below. Statements should not be numbered. Headings (i.e., Role of Funding Sources, Contributors, Conflict of Interest, Acknowledgements) should be in bold with no white space between the heading and the text. Font size should be the same as that used for references.

Statement 1: Role of Funding Sources

Authors must identify who provided financial support for the conduct of the research and/or preparation of the manuscript and to briefly describe the role (if any) of the funding sponsor in study design, collection, analysis, or interpretation of data, writing the manuscript, and the decision to submit the manuscript for publication. If the funding source had no such involvement, the authors should so state.

Example: Funding for this study was provided by NIAAA Grant R01-AA123456. NIAAA had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

Statement 2: Contributors

Authors must declare their individual contributions to the manuscript. All authors must have materially participated in the research and/or the manuscript preparation. Roles for each author should be described. The disclosure must also clearly state and verify that all authors have approved the final manuscript.

Example: Authors A and B designed the study and wrote the protocol. Author C conducted literature searches and provided summaries of previous research studies. Author D conducted the statistical analysis. Author B wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

Statement 3: Conflict of Interest

All authors must disclose any actual or potential conflict of interest. Conflict of interest is defined as any financial or personal relationships with individuals or organizations, occurring within three (3) years of beginning the submitted work, which could inappropriately influence, or be perceived to have influenced the submitted research manuscript. Potential conflict of interest would include employment, consultancies, stock ownership (except personal investments equal to the lesser of one percent (1%) of total personal investments or USD$5000), honoraria, paid expert testimony, patent applications, registrations, and grants. If there are no conflicts of interest by any author, it should state that there are none.

Example: Author B is a paid consultant for XYZ pharmaceutical company. All other authors declare that they have no conflicts of interest.

Statement 4: Acknowledgements (optional)
Authors may provide Acknowledgments which will be published in a separate section along with the manuscript. If there are no Acknowledgements, there should be no heading or acknowledgement statement.

Example: The authors wish to thank Ms. A who assisted in the proof-reading of the manuscript.

Copyright

Upon acceptance of an article, authors will be asked to complete a 'Journal Publishing Agreement' (see more information on this). An e-mail will be sent to the corresponding author confirming receipt of the manuscript together with a 'Journal Publishing Agreement' form or a link to the online version of this agreement.

Subscribers may reproduce tables of contents or prepare lists of articles including abstracts for internal circulation within their institutions. Permission of the Publisher is required for resale or distribution outside the institution and for all other derivative works, including compilations and translations. If excerpts from other copyrighted works are included, the author(s) must obtain written permission from the copyright owners and credit the source(s) in the article. Elsevier has preprinted forms for use by authors in these cases.

For gold open access articles: Upon acceptance of an article, authors will be asked to complete an 'Exclusive License Agreement' (more information). Permitted third party reuse of gold open access articles is determined by the author's choice of user license.

Author rights
As an author you (or your employer or institution) have certain rights to reuse your work. More information.

Elsevier supports responsible sharing
Find out how you can share your research published in Elsevier journals.

Role of the funding source

You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement then this should be stated.

Funding body agreements and policies
Elsevier has established a number of agreements with funding bodies which allow authors to comply with their funder's open access policies. Some funding bodies will reimburse the author for the gold open access publication fee. Details of existing agreements are available online.

Open access

This journal offers authors a choice in publishing their research:

Subscription
• Articles are made available to subscribers as well as developing countries and patient groups through our universal access programs.
• No open access publication fee payable by authors.
• The Author is entitled to post the accepted manuscript in their institution's repository and make this public after an embargo period (known as green Open Access). The published journal article cannot be shared publicly, for example on ResearchGate or Academia.edu, to ensure the sustainability of peer-reviewed research in journal publications. The embargo period for this journal can be found below.

Gold open access
• Articles are freely available to both subscribers and the wider public with permitted reuse.
• A gold open access publication fee is payable by authors or on their behalf, e.g. by their research funder or institution.

Regardless of how you choose to publish your article, the journal will apply the same peer review criteria and acceptance standards.

For gold open access articles, permitted third party (re)use is defined by the following Creative Commons user licenses:

Creative Commons Attribution (CC BY)
Lets others distribute and copy the article, create extracts, abstracts, and other revised versions, adaptations or derivative works of or from an article (such as a translation), include in a collective work (such as an anthology), text or data mine the article, even for commercial purposes, as long as they credit the author(s), do not represent the author as endorsing their adaptation of the article, and do not modify the article in such a way as to damage the author's honor or reputation.

Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND)
For non-commercial purposes, lets others distribute and copy the article, and to include in a collective work (such as an anthology), as long as they credit the author(s) and provided they do not alter or modify the article.

The gold open access publication fee for this journal is **USD 2100**, excluding taxes. Learn more about Elsevier's pricing policy: https://www.elsevier.com/openaccesspricing.

Green open access
Authors can share their research in a variety of different ways and Elsevier has a number of green open access options available. We recommend authors see our open access page for further information. Authors can also self-archive their manuscripts immediately and enable public access from their institution's repository after an embargo period. This is the version that has been accepted for publication and which typically includes author-incorporated changes suggested during submission, peer review and in editor-author communications. Embargo period: For subscription articles, an appropriate amount of time is needed for journals to deliver value to subscribing customers before an article becomes freely available to the public. This is the embargo period and it begins from the date the article is formally published online in its final and fully citable form. Find out more.

This journal has an embargo period of 24 months.

Elsevier Researcher Academy
Researcher Academy is a free e-learning platform designed to support early and mid-career researchers throughout their research journey. The "Learn" environment at Researcher Academy offers several interactive modules, webinars, downloadable guides and resources to guide you through the process of writing for research and going through peer review. Feel free to use these free resources to improve your submission and navigate the publication process with ease.

Language (usage and editing services)
Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who feel their English language manuscript may require editing to eliminate possible grammatical or spelling errors and to conform to correct scientific English may wish to use the English Language Editing service available from Elsevier's WebShop.

Submission

Our online submission system guides you stepwise through the process of entering your article details and uploading your files. The system converts your article files to a single PDF file used in the peer-review process. Editable files (e.g., Word, LaTeX) are required to typeset your article for final publication. All correspondence, including notification of the Editor's decision and requests for revision, is sent by e-mail.

Preparation

Peer review

This journal operates a single blind review process. All contributions will be initially assessed by the editor for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of two independent expert reviewers to assess the scientific quality of the paper. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. More information on types of peer review.

Use of word processing software
It is important that the file be saved in the native format of the word processor used. The text should be in single-column format. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. In particular, do not use the word processor's options to justify text or to hyphenate words. However, do use bold face, italics, subscripts, superscripts etc. When preparing tables, if you are using a table grid, use only one grid for each individual table and not a grid for each row. If no grid is used, use tabs, not spaces, to align columns. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the Guide to Publishing with Elsevier). Note that source files of figures, tables and text graphics will be required whether or not you embed your figures in the text. See also the section on Electronic artwork.
To avoid unnecessary errors you are strongly advised to use the 'spell-check' and 'grammar-check' functions of your word processor.

Article structure

Manuscripts should be prepared according to the guidelines set forth in the Publication Manual of the American Psychological Association (6th ed., 2009). Of note, section headings should not be numbered.

Manuscripts should ordinarily not exceed 50 pages, *including* references and tabular material. Exceptions may be made with prior approval of the Editor in Chief. Manuscript length can often be managed through the judicious use of appendices. In general the References section should be limited to citations actually discussed in the text. References to articles solely included in meta-analyses should be included in an appendix, which will appear in the on line version of the paper but not in the print copy. Similarly, extensive Tables describing study characteristics, containing material published elsewhere, or presenting formulas and other technical material should also be included in an appendix. Authors can direct readers to the appendices in appropriate places in the text.

It is authors' responsibility to ensure their reviews are comprehensive and as up to date as possible (at least through the prior calendar year) so the data are still current at the time of publication. Authors are referred to the PRISMA Guidelines (http://www.prisma-statement.org/statement.htm) for guidance in conducting reviews and preparing manuscripts. Adherence to the Guidelines is not required, but is recommended to enhance quality of submissions and impact of published papers on the field.

Appendices

If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

Essential title page information

Title. Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible. **Note: The title page should be the first page of the manuscript document indicating the author's names and affiliations and the corresponding author's complete contact information.**

Author names and affiliations. Where the family name may be ambiguous (e.g., a double name), please indicate this clearly. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lower-case superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name, and, if available, the e-mail address of each author within the cover letter.

Corresponding author. Clearly indicate who is willing to handle correspondence at all stages of refereeing and publication, also post-publication. **Ensure that telephone and fax numbers (with country and area code) are provided in addition to the e-mail address and the complete postal address.**

Present/permanent address. If an author has moved since the work described in the article was done, or was visiting at the time, a "Present address"' (or "Permanent address") may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

Abstract

A concise and factual abstract is required (not exceeding 200 words). This should be typed on a separate page following the title page. The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separate from the article, so it must be able to stand alone. References should therefore be avoided, but if essential, they must be cited in full, without reference to the reference list.

Graphical abstract

Although a graphical abstract is optional, its use is encouraged as it draws more attention to the online article. The graphical abstract should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership. Graphical abstracts should be submitted as a separate file in the online submission system. Image size: Please provide an image with a minimum of 531 × 1328 pixels (h × w) or proportionally more. The image should be readable at a size of 5 × 13 cm using a regular screen resolution of 96 dpi. Preferred file types: TIFF, EPS, PDF or MS Office files. You can view Example Graphical Abstracts on our information site.
Authors can make use of Elsevier's Illustration Services to ensure the best presentation of their images and in accordance with all technical requirements.

Highlights

Highlights are mandatory for this journal. They consist of a short collection of bullet points that convey the core findings of the article and should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point). You can view example Highlights on our information site.

Keywords

Immediately after the abstract, provide a maximum of 6 keywords, using American spelling and avoiding general and plural terms and multiple concepts (avoid, for example, 'and', 'of'). Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.

Abbreviations

Define abbreviations that are not standard in this field in a footnote to be placed on the first page of the article. Such abbreviations that are unavoidable in the abstract must be defined at their first mention there, as well as in the footnote. Ensure consistency of abbreviations throughout the article.

Acknowledgements

Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

Formatting of funding sources

List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, please include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Footnotes

Footnotes should be used sparingly. Number them consecutively throughout the article. Many word processors can build footnotes into the text, and this feature may be used. Otherwise, please indicate the position of footnotes in the text and list the footnotes themselves separately at the end of the article. Do not include footnotes in the Reference list.

Electronic artwork

General points

• Make sure you use uniform lettering and sizing of your original artwork.
• Embed the used fonts if the application provides that option.
• Aim to use the following fonts in your illustrations: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar.
• Number the illustrations according to their sequence in the text.
• Use a logical naming convention for your artwork files.
• Provide captions to illustrations separately.
• Size the illustrations close to the desired dimensions of the published version.
• Submit each illustration as a separate file.

A detailed guide on electronic artwork is available.

You are urged to visit this site; some excerpts from the detailed information are given here.

Formats

If your electronic artwork is created in a Microsoft Office application (Word, PowerPoint, Excel) then please supply 'as is' in the native document format.

Regardless of the application used other than Microsoft Office, when your electronic artwork is finalized, please 'Save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below):

EPS (or PDF): Vector drawings, embed all used fonts.

TIFF (or JPEG): Color or grayscale photographs (halftones), keep to a minimum of 300 dpi.

TIFF (or JPEG): Bitmapped (pure black & white pixels) line drawings, keep to a minimum of 1000 dpi.

TIFF (or JPEG): Combinations bitmapped line/half-tone (color or grayscale), keep to a minimum of 500 dpi.

Please do not:

• Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); these typically have a low number of pixels and limited set of colors;
• Supply files that are too low in resolution;
• Submit graphics that are disproportionately large for the content.

Color artwork
Please make sure that artwork files are in an acceptable format (TIFF (or JPEG), EPS (or PDF), or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable color figures then Elsevier will ensure, at no additional charge, that these figures will appear in color online (e.g., ScienceDirect and other sites) regardless of whether or not these illustrations are reproduced in color in the printed version. **For color reproduction in print, you will receive information regarding the costs from Elsevier after receipt of your accepted article**. Please indicate your preference for color: in print or online only. Further information on the preparation of electronic artwork.

Figure captions
Ensure that each illustration has a caption. Supply captions separately, not attached to the figure. A caption should comprise a brief title (**not** on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.

Tables

Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

References

Citations in the text should follow the referencing style used by the American Psychological Association. You are referred to the Publication Manual of the American Psychological Association, Sixth Edition, ISBN 1-4338-0559-6, copies of which may be ordered from http://books.apa.org/books.cfm?id=4200067 or APA Order Dept., P.O.B. 2710, Hyattsville, MD 20784, USA or APA, 3 Henrietta Street, London, WC3E 8LU, UK. Details concerning this referencing style can also be found at http://humanities.byu.edu/linguistics/Henrichsen/APA/APA01.html

Citation in text
Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

Web references
As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

Data references

This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

References in a special issue

Please ensure that the words 'this issue' are added to any references in the list (and any citations in the text) to other articles in the same Special Issue.

Reference management software

Most Elsevier journals have their reference template available in many of the most popular reference management software products. These include all products that support Citation Style Language styles, such as Mendeley. Using citation plug-ins from these products, authors only need to select the appropriate journal template when preparing their article, after which citations and bibliographies will be automatically formatted in the journal's style. If no template is yet available for this journal, please follow the format of the sample references and citations as shown in this Guide. If you use reference management software, please ensure that you remove all field codes before submitting the electronic manuscript. More information on how to remove field codes from different reference management software.

Users of Mendeley Desktop can easily install the reference style for this journal by clicking the following link:
http://open.mendeley.com/use-citation-style/clinical-psychology-review
When preparing your manuscript, you will then be able to select this style using the Mendeley plug-ins for Microsoft Word or LibreOffice.

Reference style

References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters "a", "b", "c", etc., placed after the year of publication. **References should be formatted with a hanging indent (i.e., the first line of each reference is flush left while the subsequent lines are indented).**

Examples: Reference to a journal publication: Van der Geer, J., Hanraads, J. A. J., & Lupton R. A. (2000). The art of writing a scientific article. *Journal of Scientific Communications,* 163, 51-59.

Reference to a book: Strunk, W., Jr., &White, E. B. (1979). *The elements of style.* (3rd ed.). New York: Macmillan, (Chapter 4).

Reference to a chapter in an edited book: Mettam, G. R., & Adams, L. B. (1994). How to prepare an electronic version of your article. In B.S. Jones, & R. Z. Smith (Eds.), *Introduction to the electronic age* (pp. 281-304). New York: E-Publishing Inc.

[dataset] Oguro, M., Imahiro, S., Saito, S., Nakashizuka, T. (2015). *Mortality data for Japanese oak wilt disease and surrounding forest compositions.* Mendeley Data, v1. http://dx.doi.org/10.17632/xwj98nb39r.1

Video

Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly relate to the video file's content. . In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including ScienceDirect. Please supply 'stills' with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our video instruction pages. Note: since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

Supplementary material

Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

Research data

This journal encourages and enables you to share data that supports your research publication where appropriate, and enables you to interlink the data with your published articles. Research data refers to the results of observations or experimentation that validate research findings. To facilitate reproducibility and data reuse, this journal also encourages you to share your software, code, models, algorithms, protocols, methods and other useful materials related to the project.

Below are a number of ways in which you can associate data with your article or make a statement about the availability of your data when submitting your manuscript. If you are sharing data in one of these ways, you are encouraged to cite the data in your manuscript and reference list. Please refer to the "References" section for more information about data citation. For more information on depositing, sharing and using research data and other relevant research materials, visit the research data page.

Data linking

If you have made your research data available in a data repository, you can link your article directly

to the dataset. Elsevier collaborates with a number of repositories to link articles on ScienceDirect with relevant repositories, giving readers access to underlying data that gives them a better understanding of the research described.

There are different ways to link your datasets to your article. When available, you can directly link your dataset to your article by providing the relevant information in the submission system. For more information, visit the database linking page.

For supported data repositories a repository banner will automatically appear next to your published article on ScienceDirect.

In addition, you can link to relevant data or entities through identifiers within the text of your manuscript, using the following format: Database: xxxx (e.g., TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

Mendeley Data

This journal supports Mendeley Data, enabling you to deposit any research data (including raw and processed data, video, code, software, algorithms, protocols, and methods) associated with your manuscript in a free-to-use, open access repository. During the submission process, after uploading your manuscript, you will have the opportunity to upload your relevant datasets directly to *Mendeley Data*. The datasets will be listed and directly accessible to readers next to your published article online.

For more information, visit the Mendeley Data for journals page.

Data statement

To foster transparency, we encourage you to state the availability of your data in your submission. This may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you will have the opportunity to indicate why during the submission process, for example by stating that the research data is confidential. The statement will appear with your published article on ScienceDirect. For more information, visit the Data Statement page.

After Acceptance

Online proof correction

Corresponding authors will receive an e-mail with a link to our online proofing system, allowing annotation and correction of proofs online. The environment is similar to MS Word: in addition to editing text, you can also comment on figures/tables and answer questions from the Copy Editor. Web-based proofing provides a faster and less error-prone process by allowing you to directly type your corrections, eliminating the potential introduction of errors.
If preferred, you can still choose to annotate and upload your edits on the PDF version. All instructions for proofing will be given in the e-mail we send to authors, including alternative methods to the online version and PDF.
We will do everything possible to get your article published quickly and accurately. Please use this proof only for checking the typesetting, editing, completeness and correctness of the text, tables and figures. Significant changes to the article as accepted for publication will only be considered at this stage with permission from the Editor. It is important to ensure that all corrections are sent back

to us in one communication. Please check carefully before replying, as inclusion of any subsequent corrections cannot be guaranteed. Proofreading is solely your responsibility.

Offprints

The corresponding author will, at no cost, receive a customized Share Link providing 50 days free access to the final published version of the article on ScienceDirect. The Share Link can be used for sharing the article via any communication channel, including email and social media. For an extra charge, paper offprints can be ordered via the offprint order form which is sent once the article is accepted for publication. Both corresponding and co-authors may order offprints at any time via Elsevier's Webshop. Corresponding authors who have published their article gold open access do not receive a Share Link as their final published version of the article is available open access on ScienceDirect and can be shared through the article DOI link.

Author Inquiries

Visit the Elsevier Support Center to find the answers you need. Here you will find everything from Frequently Asked Questions to ways to get in touch.
You can also check the status of your submitted article or find out when your accepted article will be published.

Appendix R: Systematic Review: Data extraction form

DATA EXTRACTION FORM		
Reviewer:		
General information	Researcher performing data extraction	
	Date of data extraction	
	Citation	
	Country of origin	
Study characteristics	Study design	
	Type of trauma exposure	
	Associated factors measured	
	Inclusion and exclusion criteria	
Participant characteristics	Age	
	Gender	
	PTSD/CPTSD diagnosis	
	Comorbidity	
Measure Information	Measure of PTSD/CPTSD	
	Measure of Traumatic Events (if applicable)	
	Measures of associated factors	
	a.	
	b.	
	c.	
	d.	
	e.	
Data collection process		
Data analysis procedure	Type of Analysis	
	Statistical techniques used	
Main findings		
Source of funding/conflict of interest		

Appendix S: Systematic review: Quality Criteria checklist

QUALITY CRITERIA CHECKLIST		**Reviewer:**	
Study identification (Include author, title, year of publication, journal title, pages)			
	In a well conducted cross-sectional study:	**Does this study do it?**	**Comments**
BACKGROUND			
1.1	The study addresses an appropriate and clearly focused question.	Yes □ No □ Can't say □	
SELECTION OF SUBJECTS			
1.2	Sample is clearly defined and the methods of selection are stated.	Yes □ No □ Can't say □	
1.3	Exclusion and Inclusion criteria are listed	Yes □ No □ Can't say □	
1.4	Cases are clearly defined and differentiated from controls (if applicable)	Yes □ No □ Can't say □	
1.5	The study reports how the sample size was reached and provides power calculations.	Yes □ No □ Can't say □	
1.6	Sample size is adequate to answer the research question	Yes □ No □ Can't say □	
ASSESSMENT			
1.7	The study uses a robust measure of PTSD/CPTSD	Yes □ No □ Can't say □	
1.8	The study uses a robust measure for each associated factor	Yes □ No □ Can't say □	
STATISTICAL ANALYSIS			
1.9	The study explains analytic methods for all outcome analyses.	Yes □ No □ Can't say □	
1.10	The study explains how missing data were handled in the analysis.	Yes □ No □ Can't say □	
1.11	The analyses are appropriate to answer the research question(s)	Yes □ No □ Can't say □	
RESULTS			
1.12	The study describes demographic characteristics and all variables of prognostic importance	Yes □ No □ Can't say □	
1.13	The study provides confidence intervals for prevalence estimates and P values for any major group comparisons.	Yes □ No □ Can't say □	
1.14	The study reports an adequate response rate (>50%).	Yes □ No □ Can't say □	
DISCUSSION			
1.14	The study discusses biases and limitations.	Yes □ No □ Can't say □	
1.15	The study states conflict of interest and/or source of funding.	Yes □ No □ Can't say □	
	SECTION 2: OVERALL ASSESSMENT OF THE STUDY How well was the study done to minimise the risk of bias?	High quality (++) □ Good Quality (+) □ Low Quality □	

Appendix T: Systematic Review: Quality Appraisal: Operationalisation of Quality Criteria

1. BACKGROUND

The study addresses an appropriate and clearly focused question. Studies that score 'yes' in this criterion present a clear and well covered theoretical hypothesis and specific objectives.

CRITERION	**Background**
'Yes'	The study addresses an appropriate and clearly focused question, a clear and well covered theoretical hypothesis and specific objectives.
'No'	Unclear or no specific objectives or hypothesis are presented.

2. SELECTION OF SUBJECTS

Studies should clearly define the population under investigation and the methods of participant selection. In particular, studies should be clear about the setting and locations of recruitment. Moreover, participant exclusion and inclusion criteria should be clearly defined, as a way of minimising selection bias. If the study has a control group, exclusion and inclusion criteria should be listed both for subjects and controls and should be applied consistently. The study should also report how it reached the specific sample size in addition to power calculations, or variance and effect estimates. Cohort studies should similarly select the two groups being studied from source populations that are comparable in all respects other than the factor under investigation. Furthermore, participation and drop-out rates should be reported.

CRITERION	**Sample is clearly defined and the methods of selection are stated.**
'Yes'	The study is clear about the setting, locations and methods of selection.
'No'	The study does not include clear definitions of the source population. Failure to do so may introduce a significant degree of bias into the results of the study and the study might be rejected.

CRITERION	**Exclusion and Inclusion criteria are clearly defined for cases and controls (if applicable)**
'Yes'	The study lists participant exclusion and inclusion criteria and these are consistently applied among participants.
'No'	The study does not list exclusion/inclusion

	criteria for the source population or these have not been consistently applied.

CRITERION	**Cases are clearly defined and differentiated from controls (if applicable).**
'Yes'	The study clearly differentiates cases from controls.
'No'	The study does not clearly differentiate between cases and controls. Failure to do so may introduce a significant degree of bias into the results of the study and the study might be rejected.

CRITERION	**Sample size, power calculations**
'Yes'	The study reports how it reached the specific sample size in addition to power calculations.
'No'	The study does not justify the sample size and fails to report any power calculations or variance and effect estimates.

CRITERION	**Sample size is adequate to answer the research question.**
'Yes'	The sample size is adequate to answer the research question, based on magnitude of effect sizes and power calculations.
'No'	Sample size is too small to answer the research question and the study is underpowered.

3. ASSESSMENT

3.1. PTSD/CPTSD

In order to reduce measurement error, the study should use a robust measure of PTSD or CPTSD. This suggests that the measurement used needs to show an acceptable level of psychometric properties i.e. validity and reliability and to be suitable for the population examined. PTSD and CPTSD measures should examine a broad range of symptom clusters in

line with current diagnostic manuals (American Psychiatric Association, 2013; Maercker, Brewin, Bryant, Cloitre, Reed, et al., 2013; World Health, 2004)

CRITERION	Robust measurement of PTSD/CPTSD is used
'Yes'	The measurement used shows an acceptable level of validity and reliability for this population (cronbach's a>0.7) and examines symptom clusters in line with diagnostic manuals. This includes DSM-IV, DSM-5 and ICD-10 criteria for PTSD and ICD-11 proposed criteria for CPTSD.
'No'	The measurement shows poor psychometric properties and is not based on DSM- or ICD- criteria.

3.2. ASSOCIATED FACTORS

Studies should include robust measures to measure PTSD or CPTSD associated factors. Similarly to the aforementioned trauma measures, measures of trauma associated factors need to demonstrate an acceptable level of psychometric properties.

CRITERION	Measurement of Associated Factors
'Yes'	The measurement used shows an acceptable level of validity and reliability for this population (cronbachs a>0.7)
'No'	The measurement shows poor psychometric properties.

5. STATISTICAL ANALYSIS

Studies that score 'yes' in this domain should explain analytic methods for all outcome analyses, including those used to examine subgroups and interactions. Moreover, studies should report how missing data were handled in the analysis.

CRITERION	Statistical analysis
'Yes'	The study explains analytic methods for all outcome analyses.
'No'	Lack of clarity on analytic methods employed.

CRITERION	Missing Data
'Yes'	The study explains how missing data were handled in the analysis.
'No'	Poor handling or no mentioning of missing data.

CRITERION	Statistical analysis
'Yes'	The analysis is appropriate to answer the research question.
'No'	Not appropriate statistical analysis is employed.

6. RESULTS AND GENERALISABILITY

Studies should describe demographic characteristics and all variables of prognostic importance. Moreover, studies should provide confidence intervals for prevalence estimates and p values for any major group comparisons. Caution should be placed on studies that only report a single value with no precision assessment (Scottish Intercollegiate Guidelines Network, 2018).

Finally, the response rate of the population approached to participate should be more than 50%, as lower response rates might mean that the study population does not adequately represent the target population and this can influence the external validity of the study (Gliner & Morgan, 2009). This should also apply to studies using postal questionnaires (Salant & Dillman, 1994).

CRITERION	Variables reported
'Yes'	The study describes demographic characteristics and all variables of prognostic importance.
'No'	Lack of clarity on the variables measured.

CRITERION	Precision analysis
'Yes'	The study provides confidence intervals for prevalence estimates and P values for any major group comparisons.
'No'	A single value is used without assessment of precision.

CRITERION	Response rate
'Yes'	The study has an adequate response rate (>50%)
'No'	The study has a low response rate (<50%)

7. DISCUSSION

A final quality criterion is for the study to discuss all biases and limitations and to state conflict of interest and/or source of funding.

CRITERION	Limitations
'Yes'	The study discusses biases and limitations.
'No'	The study does not address biases and limitations.

CRITERION	Funding/Conflict of Interest
'Yes'	The study discusses source of funding and conflict of interest.
'No'	The study fails to address the aforementioned issues.

8. OVERALL ASSESSMENT OF THE STUDY

High quality (++): Majority of criteria met (80%). Little or no risk of bias. Results unlikely to be changed by further research.

Good Quality (+): Most criteria met (>50%). Some flaws in the study with an associated risk of bias, Conclusions may change in the light of further studies.

Low quality (< or equal 50): Either most criteria not met, or significant flaws relating to key aspects of study design. Conclusions likely to change in the light of further studies.